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ABSTRACT

A study was conducted to compare the gain received from vocational education by those from low socioeconomic backgrounds to the gain received by those from high socioeconomic backgrounds to determine whether the postsecondary vocational education system lessens the gap between the social classes. Business/office, distributive, health, and trade-industrial/public service were the four areas selected for survey in three area community colleges and three vocational centers. Questionnaires were mailed to a sample of 1,565 program completers. In addition, one class from each program at each institution was administered an in-class survey. The response rate for the mailed questionnaire was approximately 41% while the in-class survey yielded 639 questionnaires. A variety of scales of socioeconomic status were constructed for each respondent, and three different techniques were used to translate occupation to socioeconomic status. The principal conclusion was that in the geographical area surveyed the postsecondary vocational and technical education system increases inequality, primarily because more upper status than lower status individuals are served by the system and because the return to upper status individuals exceeds that of the lower status individuals. However, some of the occupational programs hold promise for reducing the inequality, and occupational programs do serve a variety of purposes for those who enroll in them. (BL)

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ED149049

THE EFFECT OF POST SECONDARY VOCATIONAL EDUCATION IN ASSISTING STUDENTS TO OVERCOME CLASS AND INCOME INEQUALITY

by

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October 1977

CE 014 193

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DEPARTMENT OF ECONOMICS

October 1977

Dr. Raymond O. Shelton, Chairman
Florida State Advisory Council on
Vocational and Technical Education
W. V. Knott Building
Tallahassee, Florida 32304

Dear Dr. Shelton:

This document is submitted as a report of a project conducted for the Florida State Advisory Council on Vocational and Technical Education. The report represents the findings of a study to determine the effect of post-secondary vocational education in assisting students to overcome class and income inequality.

It is our hope that this report will be helpful to all who are concerned with strengthening Florida's vocational programs, services, and activities.

Sincerely,

William B Stronge
William B. Stronge,
Associate Professor

Wayne J. Villemez
Wayne J. Villemez
Associate Professor

An Equal Opportunity/Affirmative Action University

ACKNOWLEDGEMENTS

In conducting this research effort, we received help and guidance from many individuals and agencies, and we wish to express our sincere appreciation.

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Second, we would like to thank the administration, faculty members and staff at the six different institutions included in the study. We are especially grateful to Dr. Gary Gramenz of the Palm Beach School Board, Dr. Norman Linstrom, the Director, and his staff at North Technical Center, Mr. Robert Boegli of the Broward School Board, Mrs. Ann Robb, the Director, and her staff at Sheridan Technical Center, Dr. Fred Shallmeyer of the Dade County School Board, and Mr. Tom Coursey, the Director, and his staff at Lindsey Hopkins Technical Education Center, who assisted in undertaking our survey of students currently enrolled in the programs. At the Community Colleges, we are particularly grateful to Dean Don Witmer at Palm Beach, Dr. Mantha Vlahos at Broward and Dean George Mehallis at Miami Dade for providing similar assistance. Without the cooperation of the students in the classes surveyed and their teachers, this study would not have been possible and to them we owe particular thanks. The same is true of the many students who had completed their programs and who took time out of their busy schedules to return a lengthy questionnaire. Finally, we wish to thank the research assistants from Florida Atlantic University who aided us so ably. These included Candy Wiswell, Dottye Redman, Carole Nelson, Chris Richardson, Paul Halenda, and Eleanor Weinberger.

While all these individuals contributed to this report, responsibility for all errors rests with the authors.

William B. Stronge

Wayne J. Villemez

October, 1977
Boca Raton, Florida

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CHAPTER 1

INTRODUCTION

1.1 PURPOSE OF THE STUDY

Vocational and Technical Education is generally seen as having beneficial effects at two levels: the societal level, by correcting market imperfections, and the individual level, by accomplishing some redistribution of income. At the former level, if market forces are inadequate to correct supply and demand imbalances for various types of labor, extensive unemployment can coexist with plentiful job vacancies. By the conversion of unskilled labor into needed skilled labor, vocational training is thought to alleviate socially wasteful consequences of real world market imperfections. At the second (individual) level, vocational and technical education is generally regarded as an acceptable and efficient means of redistributing income to low income groups, and thus assisting in the reduction of class and income inequality.

There have been a great many studies of the efficacy of vocational and technical education at the first level (primarily cost-benefit studies). But the gain of low origin individuals from vocational and technical education remains problematic. That is, vocational and technical education is assumed to benefit the socioeconomically disadvantaged, but the pertinent evidence as to whether it does so or not is both contradictory and sparse. Since assisting the disadvantaged is a major goal of vocational and technical education, an adequate assessment of whether it in fact serves to reduce the inequality is very much needed. Further, if vocational and technical education is found to be less than completely successful in providing mobility opportunities to the disadvantaged, an assessment of why this is so needed.

The purpose of this research project is to examine the effect of vocational and technical education on class and income inequality. The core of the project is an analysis of the labor market experience of recent completers of post secondary vocational and technical programs in the southeast Florida area. Particular attention is paid to the experiences of completers from different socioeconomic strata. The experiences of these completers are constrasted with the aspirations of students currently enrolled, and with the experiences of a national sample of high school graduates at an equivalent stage of the life cycle.

1.2 NEED FOR THE STUDY

A major objective of Federal assistance to state vocational education systems is provide equal educational opportunity to all members of society. In the words of the 1976 Vocational Education Amendments the goal of federal policy is to provide financial assistance to the states

> ... so that persons of all ages in all communities of the state, those in high school, those who have completed or discontinued their formal education and are preparing to enter the labor market, those who have already entered the labor market, but need to upgrade their skills or acquire new ones, those with special education handicaps, and those in post secondary schools, will have ready access to vocational training or retraining, which is of high quality, which is realistic in the light of actual or anticipated opportunities for gainful employment, and which is suited to their needs, interests and ability to benefit from such training.
>
> (U.S. Congress 1976, PL-94-482, 90 Stat. 2169)

The presumption of this policy is that a major role for government policy is to ensure ready access to vocational education for the poor in order to enable them to improve their positions in society. Much of the controversy about the impact of vocational education (and education in general) on social inequality has concerned the extent to which it provides this ready access to those (disadvantaged or handicapped) members of society who would be unable to utilize it under a private system. For example, in a review of vocational education prior to the 1976 revision of the Vocational Act, the General Accounting Office examined the degree to which the system provided educational opportunities to the disadvantaged and handicapped. The GAO faulted the system for not striving hard enough to provide these opportunities:

> Although expanded vocational opportunities have been made available for the disadvantaged and handicapped, persons with special needs have not been given high priority.
>
> (Comptroller General of the United States What is the Role of Federal Assistance for Vocational Education? p. 11

This approach to assessing the impact of vocational education on social inequality has an important weakness, however. If the policy designed to assist the disadvantaged also assists the advantaged, then the relative position of the disadvantaged may not be improved. Further, if the pay-off to vocational education (in economic or social status) is less then the pay-off from other educational programs and the provision of vocational opportunities for the disadvantaged encourages a greater proportion of them to enter the vocational system, then the latter system may perpetuate class distinctions even if equal educational opportunities are provided.

> Several studies have shown that, compared with other students, vocational education students usually come from families of lower socioeconomic status and have less academic, especially verbal, ability. Their parents usually have received less education. It is not known, however, why students of lower socioeconomic status, lower occupational aspirations, or less academic ability are in vocational education programs. Researchers have not determined to what extent students with these characteristics actively chose vocational programs over other programs, and to what extent they are assigned by school administrators to vocational programs more often than other students. There seems to be a tacit assumption that these students are better prepared for work by vocational than general education since they learn skills for blue collar jobs, which they are likely to hold because of their socioeconomic backgrounds. The implication that vocational education thus perpetuates social class distinctions has not been investigated.
>
> (National Research Council, 1976, p. 10)

This concern that vocational education might perpetuate social class distinctions was also articulated in a letter to the General Subcommittee on Education of the U. S. House of Representatives from the Director of the Department of Research and Education of the North Carolina State A.F.L. - C.I.O. in 1975:

> The members of the North Carolina A.F.L. - C.I.O. feel very strongly that Career Education must not be a euphemism for a tract system in which workers' children are prepared simply to earn an hourly wage while upper middle class boys and girls study to be professionals... All too often we find working class children pushed into Career Education programs because they do not reflect the predominantly upper middle class bias of educators.
>
> (Hearings on HR 14454 93rd Congress 1974, pp. 143-144)

This study attempts to investigate whether the post secondary vocational educational system lessens the gap between the social classes. Thus, the gain to those from low socioeconomic backgrounds from vocational education is compared to the gain received by those from high socioeconomic backgrounds. The issue of why the students enrolled in vocational education is also addressed.

1.3 METHODOLOGY OF THE STUDY

The major research instrument selected for the study was a statistical analysis of a sample survey of completers of post secondary vocational and technical programs in the Southeast Florida region.[1] Two types of institutions offer such programs in the region: areawide vocational centers and community colleges. All three colleges were included in the study, but only three of the six centers were selected. Two centers were not selected because they were very small (South Tech in Palm Beach and Miami Lakes in Dade); one other was not selected (Atlantic) because the distribution of its completers closely approximated the remaining centers that were included. Thus, the three community colleges and three vocational centers (North Tech in Palm Beach, Sheridan in Broward, Lindsey Hopkins in Dade) were surveyed for the study.

---

[1] That is: Palm Beach, Broward and Dade Counties.

There were 5,861 completers of vocational programs from the areawide vocational centers in the academic year 1975-76 and 2,854 completers from the community colleges in that year. Thus, the institutions in Southeast Florida graduate almost 9,000 completers a year with about two-thirds from the centers and one-third from the colleges. Of the almost 6,000 completers from the centers, Lindsey Hopkins and Sheridan each account for about 2,000, and North Tech accounts for about 500. Of the almost 3,000 graduates from the community colleges, Miami Dade accounts for close to 2,000; Broward and Palm Beach account for 500 each.

Given the interest of the study in the relation of vocational and technical education to socioeconomic background, it is of interest to note that about five-sixths of the completers are white and two-thirds are female. Although the sex distributions are similar in the colleges and centers, there are considerably more non-whites at the centers. Because of small numbers, oriental completers were excluded from the study[2] and hispanic students were treated as whites because of the nature of the sampling frame.

There are four major areas in which programs are offered at the vocational institutions: business/office, distributive, health and trade-industrial/public service.[3] Health and trade-industrial/public service each account for about one-third of the completers; business/office and distributive each account for about one-sixth. Programs were selected for survey from each of the four areas. The distributive area was not included at the colleges because of its small size.

Given the goals of the study, the following programs were selected:

---

[2] Nonresident aliens were also excluded.

[3] Agriculture and Home Economics is an insignificant area.

Colleges: dental hygiene, registered nursing, emergency medical technology, secretarial science, general business, electronic technology and police science.

Centers: nurse's aide, practical nursing, hospital clerk, typewriting, bookkeeping, business machines, air conditioning, auto mechanics, cosmetology, hotel office, hotel PBX and travel ticketing.

The list of completers by sex, race, program, institution and year was used to generate a systematic random sample for survey. The sampling procedure was to select nine individuals randomly of each race and sex from each program in each institution in each year. If there were fewer than nine such completers, all were included. A total of 1,565 questionnaires were mailed in June, 1977. This represents about 8% of the population. One class from each program at each institution was administered an in-class survey also.

The researchers were warned by officials at the educational institutions that a high number of uncollectible questionnaires could be anticipated because of the propensity of students to change addresses after completing the programs. Thus, a forty per cent overall response rate was set as a target for the study, and a fifty per cent response rate of collectible questionnaires was also established. After three mailings and a limited amount of telephone follow-up, 364 questionnaires had been returned as undeliverable, or 23.26 per cent of the sample. A total of 642 unduplicated questionnaires had been returned by early September, a response rate of 41 per cent of the overall number mailed, and a response rate of 53.46 per cent of those delivered. The in-class survey yielded 639 questionnaires, but the population size was not available.

1.4 ANALYTICAL FRAMEWORK OF THE STUDY

Education may be viewed as a consumption good or an investment good. It is a consumption good insofar as it gives pleasure or satisfaction to the educated person by increasing his understanding of the world in which he lives, or by teaching him or her an appreciation for things whose utility is not immediately obvious to the uneducated mind. It is an investment good insofar as it gives a yield in the form of (increased) earnings over a period of time following the educational experience. For the past twenty years, the economics literature has been dominated by the analysis of the investment features of education. This is particularly fortunate, given the objectives of this study, since the investment or human capital approach to education is especially appropriate for post secondary vocational and technical education. Post secondary education is generally voluntary, and given its high cost, particularly in terms of foregone earnings, individuals are especially concerned about the rate of return on investments in it. In the case of vocational and technical education, the emphasis on preparation for an occupation testifies to the concern with increased earnings.

Returns on their post secondary vocational programs were computed for the completers surveyed. This was accomplished by estimating their total years of schooling and thereby estimating the average annual contribution of a year of schooling to their annual income. This was accomplished by dividing their annual income by number of years of schooling. Multiplying the return per year by the length of the vocational program in full time equivalent academic years yielded the contribution of the vocational program to the individual's income. This assumed that an individual would have terminated his or her education prior to the vocational program if the latter had not been available.

A variety of scales of socioeconomic status were constructed for each respondent. The general rule was to measure the status of those under 26 by the occupations of their parents, to measure the status of single females over 25 and all males over 25 by their preprogram occupations, and to measure the status of married females over 25 by their husbands' occupations. Three different techniques were used to translate occupation into socioeconomic status.

The contribution (return) of vocational education to the different social classes was obtained by summing the contributions to each of the class members. The effect of vocational education on class and income inequality was measured by the ratio of its contribution to the upper classes over the lower classes. This ratio was examined for different institutions, years, program areas, races and sexes. The in-class survey was used to shed some light on the variation in inequality effects for the different programs, races and so forth.

1.5 ORGANIZATION OF THE REPORT

This report is organized into seven chapters. Following this introduction is a review of the general economic and sociological literature on class and income inequality. The general approaches to the subject are discussed in Chapter Two, where the economic theory of human capital and the sociological theory of status attainment are selected as the optimal approaches for the subject of this report. Given the emphasis on human capital an indepth review of the literature on this topic is presented as a technical appendix to the chapter.

The survey methodology used to gather information on completers of post secondary vocational and technical programs is laid out in Chapter Three. The principles that governed the choice of vocational institutions, race and ethnic background, program area, programs and individuals surveyed are explained and analyzed. The survey instrument is also discussed. Chapter Four analyzes the response to the survey. Major attention is given to the uncollectible rates since almost one in four questionnaires could not be delivered. The response rates are also presented and discussed. The procedure for adjusting for oversampling is analyzed and the chapter concludes with a profile of the vocational completers as derived from the survey.

The central question of the study is answered in Chapter Five. The inequality effect for the entire population of completers is computed and analyzed using the human capital model. A comparative determination of the effect of vocational education on income is also presented using a regression model of the results of an already available national survey to compute expected income for the completers. This is compared to actual income. Chapter Five concludes with an analysis of the inequality effects by institution, year, program area, program, race and sex. Chapter Six attempts to explain the variation in inequality effects by use of the in-class survey whose methodology is also presented and discussed in this chapter. Chapter Seven presents the conclusions of the study and some recommendations for policy action.

1.6 CONCLUSIONS AND RECOMMENDATIONS

The principal conclusion of this study is that the Southeast Florida public post secondary vocational and technical education system increases inequality. That is, it provides more economic benefits to upper status than to lower status individuals.

Given the well known tendency of upper status individuals to spend a longer time in the educational system, the finding that they gain more from post secondary education is not surprising. When length of post secondary program is controlled, however, the results still indicate that the system increases inequality. The analysis indicates that inequality is increased because more upper status than lower status individuals are served by the system, and because the return to upper status individuals exceeds that of the lower status individuals. While this finding does not hold for all programs, it holds for the majority.

An analysis of students currently enrolled reveals that low status individuals are more sensitive to cost factors than their upper status colleagues. There do not appear to be any significant differences in drop out rates that would explain the different program completion rates between the two status groups. Lower status individuals tended to overestimate program benefits while upper status individuals underestimated them. Lower status individuals relied more heavily on family, friends and school officials in selecting their programs.

The research led to a series of six recommendations

(i) expand financial assistance to lower status individuals who wish to attend public post secondary vocational education
(ii) alter the financing structure for post secondary vocational and technical education to give more consideration to the mix of students by status and less to the overall body count
(iii) conduct a periodic review of the impact of VTE programs on inequality
(iv) expand promotional schemes designed to increase the demand for post secondary VTE among low status individuals
(v) program evaluations should be undertaken by means of carefully designed panel studies
(vi) placement should be de-emphasized as a criterion for evaluating post secondary VTE programs.

CHAPTER 2

THEORIES OF CLASS AND INCOME EQUALITY

The vast economic and sociological literature on class and income inequality has undergone a significant change in methodology during the last twenty years. The methodological shift involved a narrowing of the scope of the literature and the application of quantitative, chiefly regression tools. The methodological change began in economics around 1957 with the development of human capital theory, and the change in sociology occurred with the publication of Blau and Duncan's *The American Occupational Structure* in 1967. The change in the approaches of the two disciplines to the analysis of inequality brought them closer together and it might be said that differences within each discipline are now greater than those between them on this topic. The truth of this assertion is sometimes obscured by the differences in terminology between the two fields.

The traditional economic approach to the theory of the distribution of income focused on the functional distribution, that is, the determinants of the share received by capital, labor and land. In the pre-industrial and early industrial societies, landowners, capitalists and workers or peasants were distinct social classes so that the theory of the functional distribution was also a theory of social classes. As industrial society became more developed it became more difficult to distinguish between people on the basis of the ownership of the factors of production and an alternative economic approach to the theory of the distribution of income was developed. This stressed the role of chance in the determination of an individual's earnings. In a sense, empirical models of the income distribution were developed that had limited behavioral content. In the sociology literature, models of social mobility were also predominantly empirical in that they compared the experiences of different generations but did not have a well defined theory of the differences between them.

At the same time, sociologists developed theories of social stratification which sought to develop new definitions of social classes other than the traditional dichotomy of capitalists and workers. In these theories, also, socioeconomic background was regarded as a major determinant of current social position, and income and education were regarded as the most important measures. Income and education levels were the distinguishing features of social classes.

It was inevitable that economists would reject the stochastic theories of the income distribution for lack of behavioral content -- they flew in the face of the dominant economic philosophy, namely, individualism. Since most economists in the western world believe that individual choice is a major determinant of an individual's income, it was only a matter of time before a new economic theory was developed which attempted to explain the size distribution of income. Curiously, the new approach called the theory of human capital, initially relied upon the distribution of education to explain the distribution of income. That is, economists focused on the same two variables chosen by the sociologists: income and education. The economist stressed the role of individual choice in determining the distribution of education, however, where the sociologist stressed the influence of social background.

As the new sociological and economic theories progressed, however, they gradually grew closer together. Economists began to incorporate social background variables in their models and sociologists began to pay greater attention to the ability of individuals to determine their social position in spite of their socioeconomic backgrounds. The two fields now explain the distribution of earnings using the distributions of training, ability and socioeconomic backgrounds. The two fields fit slightly different versions of the same theory using linear regression models on primary or secondary survey data. Economists continue to emphasize human choice, as modified by ability and social background. Sociologists continue to emphasize social background as modified by ability and human choice.

This section of the report summarizes the alternative approaches to explaining the size distribution of income. The writings of the economists are surveyed first, with the end of the chapter containing a review of the sociological literature. The research reported in this publication uses the human capital theory. This approach was chosen for several reasons. First, it provides an analysis of the distribution of labor income rather than an analysis of its relative share, and this is most relevant for an analysis of the labor income of vocational and technical graduates. Second, it permits the explicit introduction of individual choice, abilities and opportunities as explanations for income inequality rather than merely representing them by a statistical distribution. Finally, it merges with the extensive sociological literature on status attainment and permits the incorporation of the results of that literature into the findings of this study.

2.1 THEORIES OF THE FUNCTIONAL DISTRIBUTION OF INCOME

National economic accountants distinguish several sources of earned income, namely, wages, profits, interest and rent. These are viewed as the rewards given to factors of production for supplying their services to the production process. In the conventional economic literature wage income is the reward paid to the owners of human resources, rental income is the reward paid to the owners of land or property, interest is the reward for tying up funds and profits are a return to enterprise, that is, risk taking and managerial expertise. In the early classical literature of Malthus (1798) and Ricardo (1817) land and labor were the two significant factors of production, so that rent and wages were the major sources of earned income.

The economic system around the beginning of the nineteenth century was still largely agrarian with the two major social classes: landlords who received only rental income, and peasants who received only wage income. During the first half of the nineteenth century Europe and North America were transformed by an industrial revolution which gradually led to a change in emphasis in income distribution theory. Land was gradually de-emphasized as a factor of production and capital, particularly industrial machinery, assumed major importance. This corresponded to the political and economic decline of the landowning class and the rise of the industrial capitalists. The major sources of earned income became identified with wages and profits, and the latter was viewed as stemming from the ownership of capital.

For the past hundred years, therefore, theories of the functional distribution of income have been concerned primarily with the distribution of the national product between the owners of capital (profits) and the owners of human resources (wages). The issues are not settled to this day (Kregel 1971). There is a conflict between the static neoclassical view that owners of factors of production are rewarded for the productivity of the factor services they supply, and the dynamic Keynesian view that the distribution of income is determined as part of the growth process of the economy with exogenously determined investment behavior determining the rate of economic growth and profits, and labor receiving the remaining income.

Because it is generally agreed that wage income is allocated differently between consumption and saving than are profits, distribution of income between these two functional sources has significant implications for economic growth. At the same time, with the increased involvement of workers in the ownership of capital, because of the development of equity markets, profit sharing plans and the involvement of pension funds in the ownership of stocks, it is no longer possible to distinguish among social classes on the basis of the ratio of their capital to labor incomes. Thus, theories of the functional distribution of income have been deemphasized in the explanation of the size distribution of personal incomes.

2.2 EMPIRICAL THEORIES OF INCOME DISTRIBUTIONS

The introduction of personal income taxes around the beginning of the twentieth century provided economists with data on the size distribution of income, essentially the number of taxpayers in different income classes. Gradually, population censuses and surveys of consumer expenditures were introduced which provided even more information on the size distribution of income. The analysis of this information was first undertaken by Italian economists and statisticians but gradually spread throughout the Western World.

The most famous Italian to study the size distribution was Vilfredo Pareto. He fit a double log function to the scatter of $(N(Y),Y)$ points where Y is a given income level and $N(Y)$ is the proportion of income recipients above that level (Pareto 1897). The relationship between the two variables is

$$N = AY^{-\alpha} \qquad A>0, \alpha>1 \qquad (2.2.1)$$

He proposed using the size of α as a measure of inequality.

The first point to note about the Pareto Coefficient is that its use as a measure of inequality depends on how well the Pareto Distribution fits the data on the size distribution of income. There is general agreement that it only fits the data well in that part of the distribution above the mode (Bronfenbrinner 1971, Bowman 1945, Cramer 1971).

Given the restriction of the Pareto Coefficient to the upper tail of the distribution it is generally agreed that larger absolute values of α can be interpreted as less inequality. This is because the absolute value of α can be interpreted as the rate which N declines as Y increases. The larger is the absolute value of α the more rapidly the proportion of income recipients whose income exceeds a given Y declines as Y increases. That is, the upper tail of the income distribution is closer to the mean for higher α. Because the Pareto distribution only fits the upper tail the Pareto Coefficient has fallen into disuse as a measure of inequality.

Corrado Gini proposed a modification of the Pareto distribution to replace Y in (2.2.1) with S, the percent of aggregate income.

$$N = BS^{-\delta} \qquad B > 0 \qquad \delta > 0 \qquad (2.2.2)$$

The type of statement consistent with Ginis' approach is the "top 10 percent of income receivers have 18 percent of the aggregate income." This approach to analyzing income inequality is still widely used today. In order to apply it the income and recipients data must be cumulated. Gini starts with recipients who have the highest income and plots the cumulative income percentage against the correspondingly cumulated recipients percentage. The slope of the least squares line is δ, the measure of inequality. Bowman (1945) shows that this measure is more sensitive than the Pareto Coefficient but that it too is only appropriate for an analysis of the upper tail. To analyze the lower tail, income should be cumulated upward but unfortunately, the two different δ obtained often give conflicting results.[1]

Nowadays the most popular statistical distribution fit to the income size data is the lognormal (Aitchinson and Brown 1957). Given the positive skewness which is characteristic of most income distributions a lognormal distribution will fit them better than a normal curve (Mincer 1970). A lognormal variable is simply a variable whose logarithm follows the normal curve.

Once the lognormal distribution is selected, its second moment (variance) is a natural measure of income inequality. This measure has the additional advantage over the variance of the levels in that it is insensitive to the units of measurement. This makes cross country or region comparisons of inequality possible. The insensitivity to units of measurement means that it measures relative rather than absolute inequality (Chiswick 1974, p. 38). That is, if all incomes doubled in a country, then the absolute variance of income would quadruple while the variance of log income would remain unaffected.

Economists were not content to fit statistical distributions to the size distribution of income, however. They attempted to build models which could be expected to generate or explain these distributions. The models they constructed, however, were stochastic rather than behavioral. As one example, one stochastic model of the lognormal distribution is presented here.

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[1] Ginis' approach to the size distribution led him naturally to the Lorenz curve, which he discovered independently of Lorenz at about the same time. For a discussion of Lorenz curves see Bowman (1945) and Bronfenbrinner (1971).

There is a fundamental theorem in statistics which says that the sum or average of a large group of independent random variables is distributed as a normal random variable. This is called the central limit theorem (Yamane 1973, pp. 139-140). A natural generalization of this approach is to consider the product of a series of variables. Since the log of a product is the sum of the lags, the central limit theorem can be applied. That is, the log of a product of variables will be normally distributed, even when the individual variables or their logs are not. When a variable has a logarithm which is normally distributed, it is said to be a lognormal variable.

The application to the size distribution follows if each person's income can be regarded as the product of a set of variables. This would suggest that the size distribution of income would resemble a lognormal distribution. The first economist to apply this idea to income distribution appears to have been Gibrat. He published his work in French in 1931 and it was translated into English in 1957. His explanation for the product of variables was chance so that an individual's income in any period y_t was related to his previous periods income y_{t-1} by the Markov process

$$y_t = u_{t-1}y_{t-1}$$

where u_{t-1} is a random shock or chance (luck) factor, that disturbs current income from its past value. This can be written by recursion as

$$y_t = u_{t-1}y_{t-1} = u_{t-1}u_{t-2}y_{t-2} = \ldots = u_{t-1}t_{t-2}\ldots u_{t-n}y_{t-n}$$

Thus, if all individuals started out at the same income y_{t-n}, the variation in their current income would reflect the different shocks represented by $u_t u_{t-1} \cdots u_{t-n}$ each experienced.

After Gibrat's work there was an outpouring of similar models. Kalecki (1945) modified the model to allow for a constant variance with age. Champernowne (1953) derived a stochastic model of the Pareto distribution and his work has been extended by Mandelbroit (1962). This literature is reviewed by Aitchinson and Brown (1957), Blinder (1976), Bronfenbrinner (1971), Cramer (1971), Lydall (1968) and Mincer (1970). Although there were attempts to build human choice into these models beginning with Friedman (1953) they remained largely ad hoc in nature. It was inevitable, however, that economists would reject the purely empirical approach and attempt to build a theory based on human choice. This occurred with the development of the theory of human capital.

2.3 THE THEORY OF HUMAN CAPITAL

The basic idea underlying the human capital approach to income distribution is that a person's labor income reflects the returns on the various investments he has made in himself. These investments collectively are called the individual's human capital. Although human capital investments may be very broadly defined to include health expenditures, the costs of migration or job search, most studies have considered training as the major investment in human capital.

Economists first began an intensive study of human capital formation when they found the growth of factor supplies (labor and physical capital) left a large positive residual in the explanation of the income growth of different countries. (See the discussion in Reynolds 1976, Chapter

14.) In the words of Reynolds (p. 303) the review of the growth of different nations indicated that

> the rate of growth of outputs was typically much above that of inputs. If inputs had been growing at, say, 2 percent a year, it was not unusual to find output growing at 4 percent. This gap between the actual growth and the growth which would be predicted from increased factor inputs is often terms *the residual*.

The obvious explanation was a change in the quality of the inputs -- more productive capital equipment and labor was being employed. The implication of this analysis was that some human beings are more productive than others, and that the mix of human beings has shifted in favor of the more productive ones over the past century. In the language of human capital theorists, more productive human beings have more human capital.

There was already a substantial literature on investment in physical capital which suggested that individuals make such investments in order to achieve a stream of discounted net earnings over the life of the capital good. Once individuals were perceived as possessing different amounts of human capital, it was natural to develop a theory of human capital accumulation analogous to the already existing theory of physical capital formation.

The major component of an individual's human capital is his training, and the part of his training most amenable to analysis in a developed economy, is his schooling. It is not surprising, therefore, that the initial work on human capital formation concentrated on schooling. The major figure in developing the human capital theory of educational attainment was T. W. Schultz (1961). The shift in emphasis brought about by the human capital approach is summarized in a survey by Blaug (1973, p. 829):

> In the field of education, the principal theoretical implication of the human capital research program is that the demand for upper secondary and higher education is responsive both to variations in the direct and indirect private costs of schooling and to variations in the earnings differentials associated with additional years of schooling. The traditional pre-1960 view among economists was that the demand for post compulsory education was a demand for a consumption good, and as such depended on given "tastes", family incomes, and the "price" of schooling in the form of tuition costs.

After the human capital approach to education was publicized by Schultz in 1960 there was a rash of studies applying the model empirically. Noteworthy among these were Becker (1960), Hansen (1963), Becker (1964), Hanoch (1967), Gintis (1971), Hanushek (1971), Griliches and Mason (1971), Hause (1972), Taubman and Wales (1974), Mincer (1974). Most of these studies are reviewed by Welch (1974). Among the issues discussed were the differences between the private and social rates of return on human capital, and between the rates of return on physical and human capital. In addition, the estimated rates of return were found to depend significantly on ability and socioeconomic background.

The application of the human capital theory to areas other than education proceeded much more slowly. There were a number of pioneering works in the symposium volume edited by Schultz (1962). The application of human capital theory to health grew during the 1960's and culminated in Grossman (1974). The application to on the job training also proceeded and is summarized by Blaug (1976), Bowman (1974) and Mincer (1974). The application of human capital theory to the acquisition of information led to a new literature on job search which is surveyed by Lippman and McCall (1976). For the purpose of this report, however, it is the application of human capital theory to the distribution of income that is most significant. This was first developed by Mincer (1958) and is the subject of the technical appendix to this chapter. The major features of the approach are outlined here.

The two features of the income distribution that are of most interest are the degree of inequality as measured by the variance and the positive skewness which can be measured in a number of alternative ways. Figure 2.3.1 contrasts two income frequency curves with different levels of inequality. It is assumed that the two income distributions are normal and have the same mean μ. A greater proportion of the income recipients have the mean income (μ) than any other income level. Furthermore,

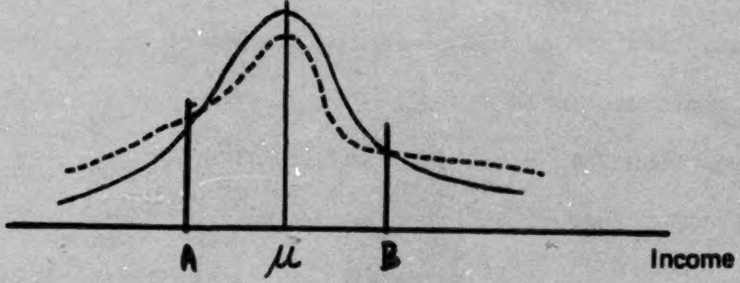

Figure 2.3.1 Two Income Distributions Differing Only by Inequality

as the income level moves away from the mean (μ) in either direction the proportion receiving the income level falls steadily. Because the proportion falls at the same speed on either side of the mean, the distribution is said to be symmetric.

The distribution represented by the dotted line has greater inequality than that represented by the solid line.[2] This is because the proportion of the population at the upper income levels (say above B) and the lower income levels (below A) is greater than for the solid line. Alternatively, the proportion of the population close to the mean (between A and B) is smaller for the distribution represented by the dotted line. The variance measures the average distance of income from the mean and thus measures the inequality described above.

The second feature of income distributions that must be explained is the positive skewness. This is illustrated in Figure 2.3.2.

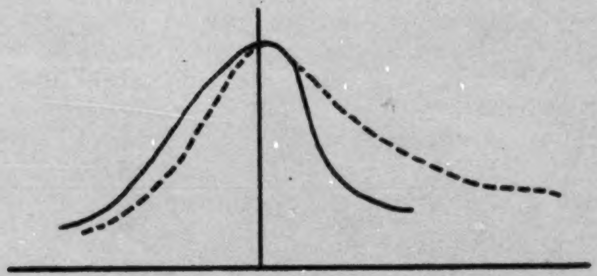

Figure 2.3.2 Two Income Distributions Differing by Positive Skewness

The distribution represented by the solid curve in Figure 2.3.2 is symmetric. The distribution represented by the dotted line is positively skewed. The upper tail fades at the upper income levels more slowly than the symmetric distribution. There is a greater proportion of the population who have extremely high incomes than who have extremely small incomes.

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[2] The area under both distributions must be unity since the percentages add to one.

The human capital theory of income distribution explains income inequality by the inequality in human investments and the inequality in the rates of return earned on those investments. The human capital stock accumulated depends on three main factors: his taste for present over future income during his life cycle, his access to financing, and his ability to earn a return on his capital. That is, three factors explain the distribution of personal earnings: individual choice, individual opportunities and individual abilities. The choice is between present and future income and the opportunity is represented by the cost of making human investments because wealthy parents can subsidize their children, In individual cases, luck, nepotism and discrimination may also play a role.

Three factors are used to explain the positive skewness of the income distribution. The first is that compensatory income differences for deferring income during investment must be greater than investment differences because the costs of investment are paid in present dollars and the returns on investment are paid in (less valuable) future dollars. An individual will accumulate twice as much education only if his future salary will be more than doubled, since that salary will not be received until after the education.

The second explanation for the positive skewness of earnings is that human capital is an input in the production of further human capital. That is the richly endowed in terms of human capital are more efficient at accumulating further human capital -- it is easier for the rich to get richer.

The third explanation for the positive skewness of income is the tendency for those with more ability to accumulate more capital. Thus, their incomes are high because they have more capital and because they obtain a higher return from it.

A more detailed discussion of the human capital theory is presented in the technical appendix. First, however, the modern sociological approach to income distribution is reviewed.

2.4 THE SOCIOLOGICAL LITERATURE ON STATUS ATTAINMENT

The publication of Blau and Duncan's The American Occupational Structure in 1967 marked the beginning of what has been called the status attainment "school" of sociologists. (Hauser and Featherman 1977, p. 4). As the title of their work implies, Blau and Duncan focus on an individual's occupation as a major indicator of his status, and construct models designed to explain why individuals enter their particular occupations, and the consequences of these occupational choices for an individual's status in society.

> Our research on the American occupational structure is in the tradition of national surveys of occupational mobility. It shares with them the assumption that the understanding of social stratification in modern society is best promoted by the systematic investigation of occupational status and mobility. In short, the focus is on the stratified hierarchy of occupations rather than on some other aspects of social differentiation. (Blau and Duncan 1967, p. 5).

They note that occupation position is not identical either with economic class or prestige status. Economic class is usually defined in terms of economic resources and interests and that the primary determinant of these for the large majority of men is their occupational position. Like the economists movement away from the analysis of the functional distribution of income, Blau and Duncan reject the Marxian distinction between workers and capitalists because of the separation of ownership from control of major corporations. They also note that

> Conceptually, there is a closer relationship between economic class and occupational position than there is between occupational position and prestige status. But there is also some relationship between the latter two because many occupational pursuits (notably those involving physical labor) are incompatible with the "honor" of belonging to the higher prestige strata. In addition, the maintenance of the "proper" style of life of these higher strata requires considerable economic resources (ibid, p. 6).

The focus on occupational position has not been accepted unanimously by the sociology profession but it has acquired considerable support since 1967 and is a cardinal principle of the status attainment school. A second feature of the work of this school has been the attempt to build and estimate models designed to explain an individual's occupational position. In the words of Blau and Duncan

> The predominant emphasis in mobility research has been on the analysis of the occupational mobility matrix as a self contained entity. Although the results of this analysis describing the mobility pattern are occasionally related to other variables, such as education or fertility, the major preoccupation is typically the internal analysis of mobility tables, and relatively little attention is devoted to the systematic investigation of the relationships between other factors and occupational mobility. The tendency to conceive of mobility as a single variable and examine it largely without relating it to other variables has severely restricted the fruitfulness of mobility research ... preoccupied with mobility as such, investigations have generally not supplied sufficient information on its correlates to make it possible to explain the observed mobility patterns. (p. 8).

In building models to explain occupational position, Blau and Duncan note that a primary determinant of an individual's occupational destination is his occupational origin.

> A substantive problem of central concern to us, which mobility research in the past has largely neglected is, therefore, how the observed patterns occupational mobility are affected by various factors, such as a man's color, whether he has migrated, or the number of his siblings and his position among them. We found it advantageous, however, to reformulate this problem by decomposing the concept of occupational mobility into its constituent elements: social or career origins and occupational destinations. Rather than asking what influence a variable -- community size, for instance -- exerts on upward mobility, we ask what influence it exerts on occupational achievements and how it modifies the effect of social origins on these acheivements. (p. 9).

Thus, the status attainment school formulates the problem as explaining the bridge between a person's social origins and his occupational attainment. If one carries the analysis one step further to recognize the link between occupational attainment and an individual's earnings, two of the variables stressed by the human capital literature (social background and earnings) have by now entered the sociological model.

The variables that form a bridge between background and occupation (earnings) in status attainment models are individual ability and educational attainment (years of schooling). These are precisely the variables stressed by the human capital theory also, so that the same background -- ability -- education -- earnings sequence becomes the object of analysis of both social sciences. The sociologists focus on the status of the resulting occupation and may or may not include earnings as a measure of this (Duncan, Featherman and Duncan 1972, Sewell and Hauser 1975, Hauser and Featherman 1977). The economists focus on earnings as the ultimate object of analysis, stress other forms of human capital besides education such as on the job training, and may pay little attention to other aspects of an individual's occupation.

There are some methodological differences in approach between the two disciplines. Economists typically do not collect their own data and hence devote considerable effort to utilizing existing data sets usually not constructed for their purposes. Sociologists collect their own data and thus have more information that enables them to estimate more complex (multiple equation) models in contrast to the single equation approach of the economist. On the other hand, the rationality and competitive assumptions of the economist enable him to develop tighter hypotheses. Thus, the two fields complement rather than compete with each other and provide considerable information and theory relevant to the research problem that is the focus of this report.

2.5 TECHNICAL APPENDIX: HUMAN CAPITAL, RATES OF RETURN AND THE DISTRIBUTION OF EARNINGS

The human capital theory of income distribution outlined in this chapter is considerably more technical than the summary of its findings presented earlier. This appendix presents a detailed review of the literature on the theory with particular emphasis on the models of the personal distribution of earnings. Because of its technical nature, the review is presented as an appendix.

2.5.1 A SIMPLE MODEL OF SCHOOLING AND THE DISTRIBUTION OF INCOME

The first application of human capital theory to the size distribution of income was made by Mincer in 1958. He began with a simple model in which he assumed that all individuals had the same abilities and differed only by the amount of schooling they received. This would be consistent with an assumption that all individuals had the same opportunities and accumulated different amounts of schooling because of differences in tastes for present over future income. Mincer initially assumed that, although different amounts of schooling yielded different starting salaries, the latter were expected to remain constant throughout an individual's working life. For simplicity, it was assumed that all individuals worked the same number of years,[3] and that the only cost of schooling was the amount of foregone earnings during the schooling period.

Figure 2.5.1 illustrates the properties of this model. It is helpful to measure age from the beginning of voluntary schooling (age zero).

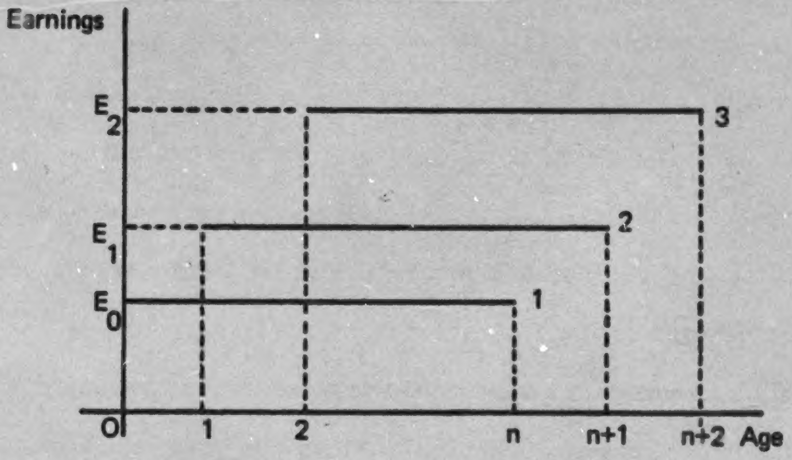

Figure 2.5.1 Lifetime Earnings Streams of Three Individuals in a Simple Mincer Model

Individual 1 undertakes no (voluntary) schooling thus receives the same level of income E_o from age zero until retirement at age n. Individual 2 receives no income until age 1 and then receives a higher constant level of income E_2 for the same number of years (n) until retirement age n+1. Individual 3 receives no income until age 2 and then receives a higher constant level of income E_3 until retirement at n+2.

The chief conclusion of this model is that the income differential (E_1-E_o) is smaller than the income differential (E_2-E_1). Indeed

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[3] There is more support in the recent empirical literature for the assumption that more educated people retire later in life (Mincer 1974).

Mincer shows that

$$\frac{E_2}{E_1} = \frac{E_1}{E_o} = 1+d \qquad (2.5.1)$$

where d is the (common) discount or interest rate used by the decision makers.[4]

To derive this conclusion requires the assumption of perfect competition and that individuals act to maximize the present value of their lifetime earnings. Under those circumstances, schooling would serve as a vehicle for altering the time profile of one's income stream but not for enlarging it. That is, the individual can forego income in the short run (during schooling) and obtain a higher income later, but the present value of each individual's lifetime earnings would be the same. In this model different levels of schooling reflect different tastes for present over future income. The highly educated person foregoes present income in return for higher but later income; the less educated has a smaller but immediate income.

Perfect competition assures that the present values of all income streams regardless if the educational level are the same -- if they were not, all individuals would enter the highest stream and the increase of those entering that occupation would drive wages down.

The conclusion that $E_2-E_1>E_1-E_o$ in Figure 2.5.1 follows from the fact that the educated person gives up present dollars in return for a higher level of future dollars, and since the future dollars are worth less than the present ones (they must be discounted), the educated person must get back relatively more future dollars than he gives up in the present.

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[4] The discount rate would be the market interest rate, since perfect competition would deter investments that yielded a smaller rate of return and resources would flow into those providing schooling for occupations with a higher rate.

The implication for the income distribution is that even if the distribution of schooling was symmetric, the distribution of income would be positively skewed. If one sampled the wage earners from an economy obeying the assumptions of this model, and the distribution of training was normal, the distribution of earnings would be a lognormal function. From equation (2.5.1) using recursion

$$E_s = E_o(1+d)^s \tag{2.5.2}$$

where s is the number of years of schooling. Taking logs

$$\ln E_s = \ln E_o + (1+d)\ s \tag{2.5.3}$$

so that the log of earnings is a linear function of s. Hence E_s follows a lognormal distribution which is positively skewed (Aitchinson and Brown 1959), if s follows a normal distribution. Furthermore, the distribution of E_s is determined by the distribution of s. That is, the distribution of income is determined by the distribution of schooling.

Mincer notes that relaxing the assumptions of the model strengthens the conclusions. If costs other than income foregone are allowed, "the additional cost element naturally widens the compensatory differences in earnings particularly at the upper educational levels, where such costs are sizeable" (p. 285). Further, the assumption of identical abilities may be relaxed. Under these circumstances, "given freedom of choice, persons with greater learning capacity are more likely than others to embark on prolonged training. In so far as earnings are positively related to such qualities, aggregative skewness is augmented" (p. 286).

The extension of the model which most interests Mincer, however, is the incorporation of experience on the job as part of the training process. He proposes to measure this by an individual's age, and incorporates it in the model by allowing the lifetime earnings profiles to become concave as in Figure 2.5.2.

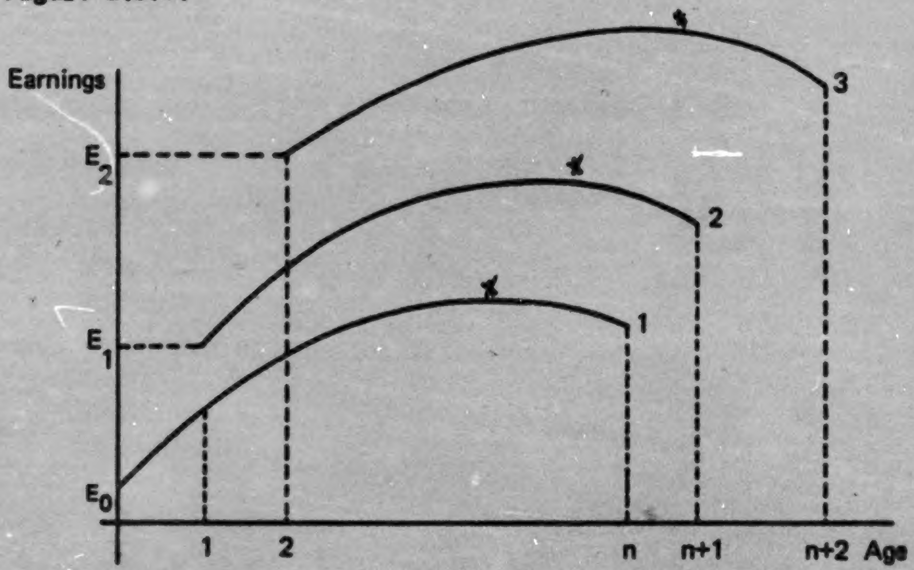

Figure 2.5.2 Lifetime Earnings Streams of Three Individuals Receiving On the Job Experience.

Earnings typically rise for several years after the individual commences work, then peak and decay as the individual approaches retirement and his human capital depreciates significantly.

The specification of the effect of on the job training on an individual's earnings as outlined above has received wide support in the literature. What is noteworthy about Mincer's approach is the relationship between lifetime earnings profiles corresponding to different occupations, that is, different levels of schooling. The asterisks in Figure 2.5.2 denote the peak level of earnings. Those who begin work later reach their peak later than those who begin earlier, which is not implausible given that the movement to the peak represents training on the job. What is controversial is the relationships between the slopes of the curves. The more highly educated individual climbs to his peak more rapidly than the less educated, and slips away from his peak more slowly.

Mincer derives two implications from this assumption about the slopes of the lifetime earnings profiles. First, "the statement that the life paths of earnings are steeper for the more highly educated groups of workers means that income differences between any two members of such a group differing in age are greater than income differences between their contemporaries in an occupational group requiring less training" (p. 288). This tendency would lead one to expect greater inequality of income in the more highly trained groups, if the age distributions of members of the groups were much the same. There is no *a priori* reason why different cohorts of the population would greatly differ in their preferences for schooling so that it is not unreasonable to assume that age distributions *by training level* are roughly similar. Substantial changes in interest rates might lead to short term disequilibrium until the distribution of earnings by training compensated for them. By industry, however, the age distributions within each training level might be significantly different as the mix of training levels required by the production technology altered. Thus, Mincer believed that income dispersion should increase with levels of training.

The second implication of the steeper lifetime earnings profiles among the more educated has to do with income dispersion within each age group. This will reflect the distribution of training among the members of the group. Older members of the group will have greater income differences. "Life patterns of earnings are not parallel; their divergence becomes more pronounced with added years of experience, so that income dispersion increases as we move from younger to older age groups" (p. 289).

Mincer draws three conclusions from his extended model.

> First, it is obvious that the addition of 'intra-occupational' differences to 'inter-occupational' differences increases aggregate inequality. Moreover, 'inter-occupational' differences themselves must increase: The present value of a lifeflow of income of given size is smaller, the steeper the positive slope of the age income relation. Hence the equalization of present values requires larger 'inter-occupational' differences in income than those derived on the assumption of horizontal income flows in all 'occupations'. Finally, it can be shown that the conclusions about 'intra-occupational' patterns of income dispersion reinforce the implication of aggregative positive skewness reached on the basis of 'inter-occupational' differences above (in the simple model)" (p. 290).

This last conclusion follows from the greater dispersion among the more highly trained groups which extends the right hand tail of the income distribution.

The above model was applied to a variety of data by Mincer and he concluded that "the empirical evidence is clearly consistent with all the implications of the model about the effects of education, occupation, and age on patterns of income distribution" (p. 302). He noted that the model omits extensive consideration of two major factors which usually receive considerable attention in discussions of class and income inequality, namely, the distribution of abilities and the effect of socioeconomic background. Nevertheless, he states that "the purely compensatory factor around which the model is built was chosen for its inherent significance, its analytical convenience, and the theoretical interest attaching to the result that even perfect equality of ability and opportunity implies neither income equality nor symmetry in the income distribution" (p. 302). The basic conclusion of Mincer's model is that the distribution of income reflects the distribution of training (both formal and on the job).

2.5.2 MODELS OF THE RATE OF RETURN ON HUMAN CAPITAL

An alternative view of the term d in the human capital model outlined above would be to view it as the rate of return. The rationalization for this is that (from (2.5.1))

$$E_2/E_1 = 1+d \qquad (2.5.4)$$

which means that

$$d = E_2/E_1 - 1 = E_2/E_1 - E_1/E_1 = \frac{E_2-E_1}{E_1} \qquad (2.5.5)$$

In other words, d is the percentage return on an investment of E_1 dollars in human capital.

The previous model assumed perfect competition so that all individuals would freely move into the human investment which would yield the highest return. Thus everybody received the same rate of return and this equaled the interest rate. Excess return would be eliminated by the movement of resources into the abnormally profitable investment; financial capital would move into the human capital market to obtain a higher return until the two returns were equalized.

If the assumption of perfect competition is relaxed, then entry into the human capital market would be restricted so that rates of return would differ among individuals and from the market rate. The restriction of entry would take the form of financial capital market segmentation, so that the marginal cost of funds necessary to finance human investments would be upward sloping. The market segmentation would arise because of government subsidies for certain human investments and because of the differential between the cost of internal (or family) finance and external finance as obtained from, say, financial institutions. This is discussed by Becker

(1974, pp. 102-103). The typical individual would use a mix of three financing sources: government, family and external. The cost of funds might typically rise as the individual moved from one source to the next.

Allowing for financial market segmentation introduces the idea of inequality of opportunity. Presumably, the family finances of individuals differ so that there is variation in their marginal cost of funds. Individuals from higher socioeconomic backgrounds find it easier to finance longer periods of schooling. Because entry is effectively restricted into the occupations requiring longer periods of schooling, rates of return on different years of schooling will differ. Under these circumstances the relation between earnings with no schooling and earnings with s years of schooling will be (Chiswick 1974, pp. 35-36):

$$E_s = E_o \pi_{j=1}(1+r_j) \qquad (2.5.6)$$

where π denotes the operation of taking the product of the terms $(1+r_j)$.

The implication of market segmentation is to accentuate inequality and the positive skewness that would arise in an income distribution under the conditions of the simple model.

It is also possible to extend the basic schooling model to include income earned during schooling and direct schooling costs as well as earnings foregone. Let E_j be the difference between the total cost of the j^{th} year of schooling, including direct costs and income foregone, and income earned during schooling. Define K_j

$$K_j = C_j/E_{j-1} \qquad (2.5.7)$$

the cost of schooling as a proportion of foregone income. Then the investment made by an individual in the j^{th} year of schooling would be C_j and the earnings would be

$$E_j = E_{j-1}+r_jC_j = E_{j-1}+r_jK_jE_{j-1} = (1+r_jK_j)E_{j-1} \qquad (2.5.8)$$

By recursion E_s can be shown to be

$$E_s = E_o \prod_{j=1}^{s}(1+r_jK_j) = E_o \prod_{j=1}^{s}(1+r_j^*) \qquad (2.5.9)$$

where r_j^* is the "adjusted" rate of return to the j^{th} year of education. In so far as the total cost of education is increased by direct costs inequality would be accentuated; the ability to earn income while in school would reduce income inequality by expanding opportunity although these may be costs in terms of performance that would weaken this effort.

An additional source of variation in rates of return is the distribution of individual abilities. In terms of the mathematical statement of the model the level of earnings in the absence of schooling (E_o) differs

$$E_{is} = E_{io} \prod_{j=1}^{s}(1+r_{ij}^*) \qquad (2.5.10)$$

by individual, and the (adjusted) rate of return on each year of schooling (r_j^*) also varies by individual.

This introduces a new source of inequality and positive skewness, namely, the tendency of individuals with high ability (rates of return) to invest themselves more than those with low ability. Thus, the inequality introduced by high levels of human capital is magnified by the tendency of those who receive high rates of return to have high levels of human capital (Becker 1975, pp. 87-88).[5]

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[5] Becker also extends this analysis to support Mincer's finding that inequality would increase with age by noting that E_o is more important for the young, and that the costs of investments also reduce their income. That discussion (1975, pp. 88-89) is not important for this study.

2.5.3 REGRESSION FORMULATION OF THE SCHOOLING MODEL

The schooling model is that special case of the general human capital theory where the only human capital considered is schooling. This has been the most popular application of the theory and reflects the ready availability of data on years of schooling completed, and the difficulty of obtaining data on other forms of human capital such as on the job training. Since the data collected for this study pertains to recent completers of vocational and technical education programs, the schooling model is particularly appropriate.

Equation (2.5.10) above assumes that earnings depend only on accumulated human capital (schooling), the rates of return on the units of human capital, and earnings in the absence of any schooling. The stochastic models above stressed the role of chance on individual earnings. Thus, is is natural to allow for this factor by adding a multiplicative disturbance term U_i to (2.5.6). This term would also account for other forms of human capital besides schooling. The result is

$$E_{is} = E_{io} \prod_{j=1}^{S} (1+r^*_{ij}) U_i \qquad (2.5.11)$$

If data on a sample of individuals earnings (E_{is}), their unschooled earnings E_{io} and their adjusted rates of return were available (r^*_{ij}) this equation could, in principle, be estimated using least squares. In practice, unschooled earnings figures are not available, and individual rates of return on each year of schooling are not available either. The approach taken is to define

$$E_{io} = \bar{E}_o + e_{io} \qquad (2.5.12)$$

$$\bar{r}^*_{ij} = \bar{r}^*_j + p_{ij} \qquad (2.5.13)$$

where $\bar{E}_o$ is the average level of unschooled earnings, and $\bar{r}_j^*$ is the average rate of return on j years of schooling. Then

$$E_i = \bar{E}_o \prod_{j=1}^{s_i}(1+\bar{r}_j^*)V_i \tag{2.5.14}$$

where the subscript s is dropped from E_i and a superscript i is placed on the upper limit of the product. The new disturbance term V_i contains luck U_i and ability as represented by the premium p_{ij} received by i on j years of schooling.

Taking the logs of both sides and using the approximation

$$\ln(1+\bar{r}_j^*) = \bar{r}_j^* \tag{2.5.15}$$

which is highly accurate for small $\bar{r}_j$ as is the case here, (2.5.14) may be written

$$\ln E_i = \ln\bar{E}_o + \sum_{j=1}^{s_i}\bar{r}_j^* + v_i \tag{2.5.16}$$

Finally, defining

$$\bar{r}_j^* = \bar{\bar{r}}^* + \delta_j \tag{2.5.17}$$

where $\bar{\bar{r}}^*$ is the average rate of return over all individuals over all years of schooling, then (2.5.16) may be written

$$\ln E_i = \ln\bar{E}_o + \bar{\bar{r}}^* s_i + u_i \tag{2.5.18}$$

where the new residual contains the interschool year differences in the rates of return.

The advantage of (2.5.18) is that it may be estimated using ordinary least squares and this was done by Becker and Chiswick (1966), Chiswick (1967) and Chiswick (1974). The rate of return $\bar{\bar{r}}$ estimated using (2.5.18) is unbiased only if s_i and u_i are uncorrelated. Some of the components of u_i are positively correlated with s_i (especially other investments in human capital such as health and migration expenditures) (Chiswick 1974, pp. 42-45). In cross section data, however, an extremely important form of human capital (experience) will be negatively correlated with schooling (since schooling takes place at the expense in time of experience). Thus, the direction of correlation between s_i and u_i in (2.5.20) is not clear *a priori*. Comparisons of different methods of estimating the rate of return with the results of the regression model suggest that the regression estimated is biased downward. When this is taken into account, the empirical results as summarized by Chiswick (1974) support the human capital theory of income distribution. The inequality in income reflects the inequality in years of schooling and rates of return.

2.5.4 AN ANALYTICAL APPROACH TO THE HUMAN CAPITAL THEORY OF PERSONAL INCOME DISTRIBUTION

In a paper published in 1967, Gary Becker introduced an analytical apparatus that clarifies the human capital theory of personal income distribution greatly (Reprinted in Becker 1974). His apparatus is the standard one used for analyzing physical capital investment decisions. Its core is a supply and demand for human capital diagram as in Figure (2.5.3).

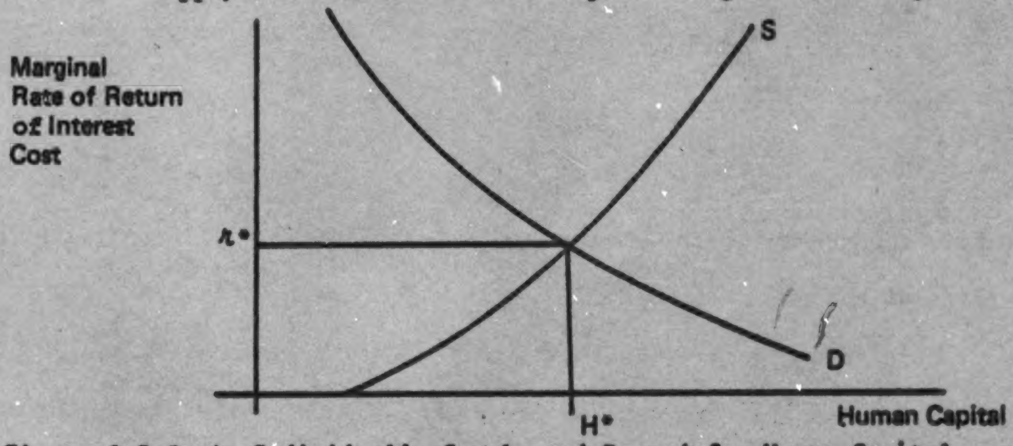

Figure 2.5.3 An Individual's Supply and Demand for Human Capital

To derive the individual's human capital curve it must be viewed as a marginal net benefit curve which shows the marginal percentage rate of return received by the individual as he accumulates more human capital. As drawn the marginal return is expected to decline as more capital is accumulated. That is, for example, the marginal return from a grade school education is higher than from a high school education which is higher than the return from a college education which is higher than the return from graduate school. Of course the marginal returns are positive, so that the total return (income) of an individual increases as he acquires more education.

The question arises: Why does the marginal return decline? To answer this Becker suggests considering the individual as a producer (by his investments) of his human capital. The production of human capital by an additional investment is subject to the same law of diminishing returns as the production of other economic goods. Because "the memory capacity, physical size, etc. of each investor is limited, eventually diminishing returns set in from producing additional capital. The result is increasing marginal costs of producing a dollar of returns" (p. 99)

A second reason why the marginal cost of producing human capital rises (and thus the marginal returns decline) is that one's own time is an input into the production of human capital and there is an incentive (foregone earnings) to produce the human capital reasonably quickly. Because larger human capital investments imply that the returns will not be realized until the individual is older, they will yield a return over a shorter period (until retirement) and will be discounted more strongly than earlier investments. These considerations will raise the marginal cost of later human investments. Furthermore, as human capital increases, foregone earnings must also increase and thus the opportunity cost of later human investments increase.

The upward sloping supply curve is the marginal cost of financing the human investments. As explained above, this rises because of market segmentation. The typical method of financing human capital being a combination of subsidies, internal (family) funds and external financing. Interest charges rise as the individual moves from internal to external financing.

The rational individual will choose as his desired stock of human capital that level corresponding to the intersection of the supply and demand curves, namely H* units of human capital in Figure 2.5.3. To achieve a level of human capital above H* would require an interest cost above r* while yielding a marginal return of less than r*. If an individual accumulates less than H* units of human capital, he will not have maximized his (net) present value and this conflicts with the assumption of rationality.

The theory presented above follows fairly naturally from the conventional theory of investment behavior (Jorgenson 1963).[6] What is interesting about its application to human capital is the choice of parameters for the supply and demand curves. Becker argues that the major shift factor for the demand curve is individual ability (A). That is, a more able individual will have a higher demand curve than a less able one, since he will achieve higher rates of return on each unit of human capital invested. This statement is almost tautologically true, since Becker defines ability as the capacity to achieve a higher return for the same investment. Empirically, of course an individual may achieve a higher return for other reasons such as discrimination, socioeconomic background and/or nepotism. Becker assumes these factors are dominated by ability differentials.

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[6] No allowance is made for uncertainty in the conventional theory or its application to human capital. This reflects a shortcoming of the economic theory of investment due to the current state of knowledge in economics in general.

The major shift factor for the supply function is socioeconomic background (B). Individuals from higher backgrounds can obtain financing for human investment at lower interest costs than those from lower backgrounds. Discrimination, luck and even ability may also play a role in shifting this function but Becker assumes that background is the major factor.

The individual's earnings will reflect both his level of human capital and the rate of return. It will also reflect his unschooled earnings. Becker assumes that in an advanced economy this factor will be relatively small and variation in it can be neglected.[7] Thus, the primary determinants of individual differences in earnings are individual differences in stocks of human capital, and in rates of return. In other words, individuals have different levels of earnings because they have different equilibrium points in Figure 2.5.3.[8]

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[7] It is also assumed that actual and desired human capital stocks are equal.

[8] Becker notes that in empirical work the earnings figures available to the researcher may differ from those required by the theory because of definitional differences (p. 105).

To illustrate the operation of the model Becker begins by considering two polar cases. The first, the "egalitarian" case, is where policymakers assume that all individuals have the same demand curve for capital but have different supply curves. (Figure 2.5.4)

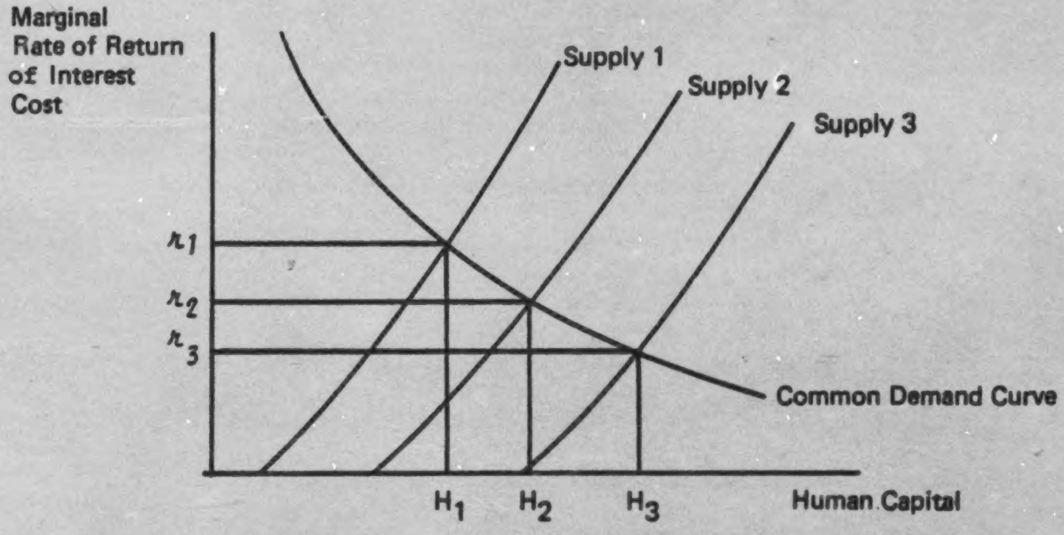

Figure 2.5.4 The Egalitarian Case of Income Inequality

The assumption of a common demand curve amounts to the assumption of identical abilities; the assumption of inequality of opportunity. Individual 3 accumulates more human capital (e.g. goes to college) than individual 2 because he has more opportunities. Although his marginal rate of return will be lower, his earnings as approximated by

$$E_3 = \bar{\bar{r}}^*_3H^*_3$$

will be greater than the earnings of individual 2, as approximately

$$E_2 = \bar{\bar{r}}_2H^*_2$$

provided the demand curve D is not reasonably inelastic (is not too flat). In this case, inequality of earnings reflects inequality of opportunities and the government may respond by attempting to make college equally accessible to all. Such a policy would be "egalitarian". Because, $\bar{\bar{r}}^*$ declines as H* increases the equality in earnings will be less than the inequality in human capital.

A second case is the "elitist" case as represented by Figure 2.5.5. All individuals have the same supply of capital curve but they differ in their demand curves.

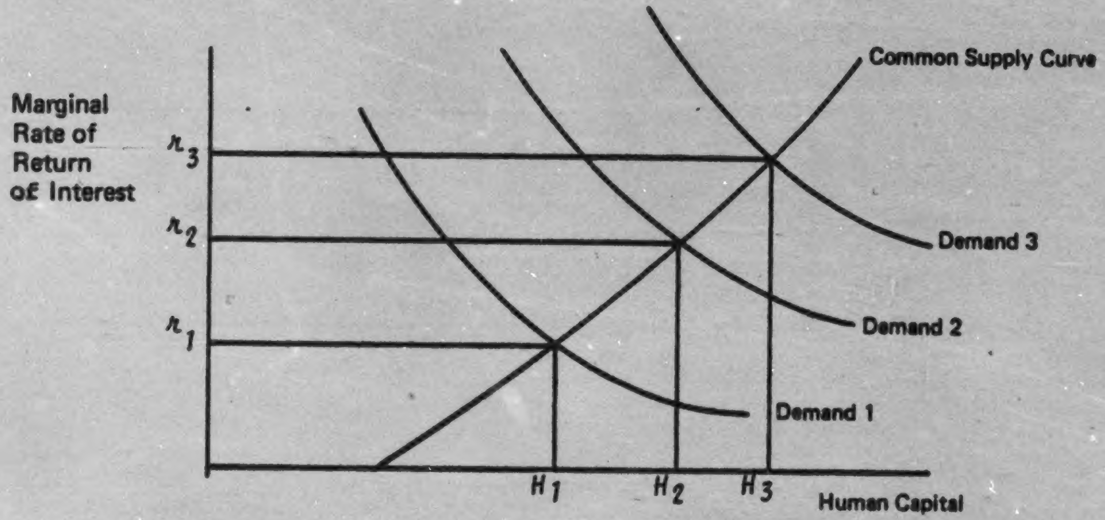

Figure 2.5.5. The Elitist Case of Income Inequality

The assumption of a common supply curve amounts to the assumption of equality of opportunity and the assumption of different demand curves amounts to assuming inequality of ability. Individual 3 accumulates more human capital (again, assume for example, he goes to college) because he is brighter than individual 2. In this case the marginal rate of return increases as the level of human capital increases, so that the inequality in income is greater than the inequality in human capital.[9]

A third case is discussed by Mincer (1970, pp. 19-20). This is the case of a perfect positive correlation between ability and opportunity as illustrated in Figure 2.5.6. Those with greater ability have greater opportunity so that when the demand curve shifts upward (greater ability) the supply curve shifts downward, and individuals have the same marginal rates of return but different levels of human capital. Earnings would be very highly correlated; the human capital, marginal rates of return would

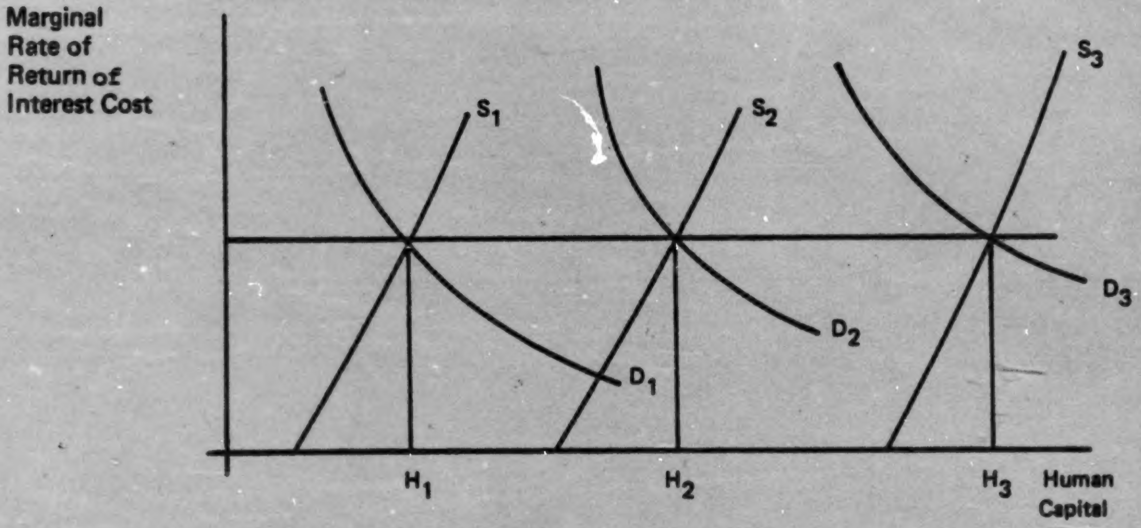

Figure 2.5.6 A Perfect Correlation of Ability with Opportunity

have no correlation with human capital, and average rates could be positively or negatively related.[10]

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[9] Becker believes that European educational policy reflects an elitist view of human capital accumulation and that U.S. educational policy reflects an egalitatian view.

An interesting feature of this case is that government policies to equalize opportunities would reduce economic efficiency unless the common supply curve was horizontal. This is because efficiency requires that marginal rates of return be equal across individuals, and equalizing opportunity in the case of Figure 2.5.6 would destroy the equal marginal rates of Figure 2.5.6. Reducing the ability of the more able to invest in themselves would reduce national output.

Nobody maintains that ability and opportunity might be perfectly negatively correlated in the real world. Such a case would appear as in Figure 2.5.7.

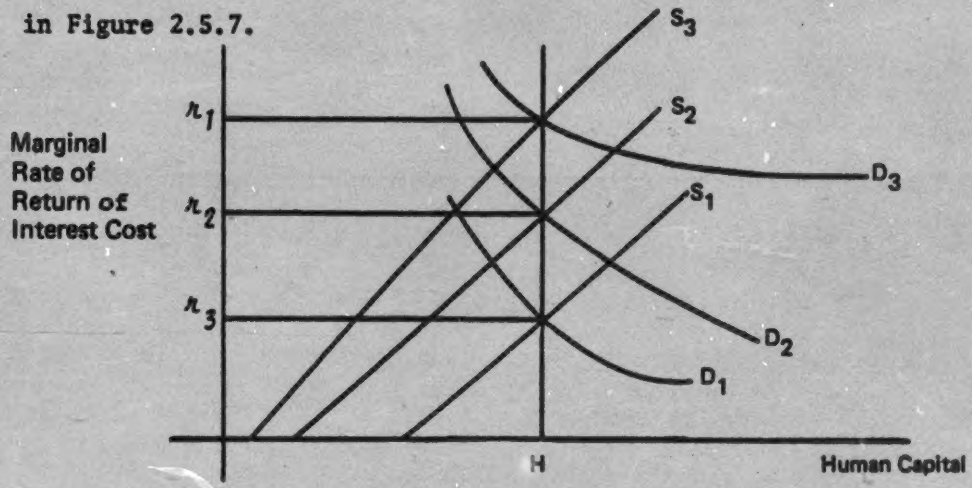

Figure 2.5.7 A Perfect Negative Correlation of Human Capital and Opportunity

What is important about this case is that data are frequently collected on individuals with the same level of education (human capital). Such a data set might be a "follow up" study of all completers of a post secondary vocational program a year or two after finishing the program. Such individuals might, by and large, have accumulated the same amount of human capital. The correlation of ability and background of such individuals should be negative; further, the correlation of earnings and background of such individuals should be negative also. This, by itself says nothing about equality of opportunity, however. This case of the human capital accumulation model has important implications for this study and forms the basis of the analysis chapter. Before beginning the analysis, however, some of the limitations of the human capital model should be developed.

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[10] The marginal rate of return would be proportional to the average rate but the proportionality factor would depend on the elasticity of the demand curves. See Becker (1975, p. 136).

2.5.5 LIMITATIONS OF THE HUMAN CAPITAL MODEL

Although the human capital model represents a considerable advance over previous work by economists on income distribution, the approach is not without its weaknesses. It is possible to disagree with the economic philosophy underlying the theory with its stress on individual choices as a major determinant of individual income. This is certainly the objection of Marxists such as Bowles and Gintis (1975). Along these lines, some of the assumptions of the theory such as the vagueness of the human capital concept or its presumed homogeneity have been challenged in the literature (Blaug 1976).

But even if the fundamental approach of the theory is accepted, it is still not without its problems. A major difficulty involves the failure to consider the other decisions made by an individual other than the accumulation of human capital. Other such decisions are the labor supply decision and the decision to accumulate financial assets. For example, since education is often occupation specific, and since different occupations require different labor supply patterns, the decision on investing in human capital is not independent of the labor supply decision.[11] Similarly, human capital is to some extent a substitute for financial capital because both provide a means of redistributing income throughout an individual's life.

Along these lines, because human capital pays off over time, decisions about human investments must reflect life cycle considerations. In the analysis of Becker given above, for example, the treatment of the investment period is very vague. An individual, having decided to accumulate a certain desired human capital stock, must also decide on the speed of its accumulation. During the period of accumulation, the individuals supply and demand curves are likely to shift. Thus, the process of accumulating human capital is inherently dynamic but much of the human capital theory is static. There has been some work extending the theory along these lines (Ben Porath 1967 and 1970) but it is difficult to implement empirically.

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[11] Thus, the objective function maximized by the investor in human capital is the present value of alternative investments. Individuals are usually assumed to maximize utility, and this contains consumption and leisure as arguments (Blinder 1976).

CHAPTER 3

A SURVEY OF COMPLETERS OF POST SECONDARY VOCATIONAL AND TECHNICAL PROGRAMS: METHODOLOGY

In order to test hypotheses about the effect of vocational education on inequality, data were collected on completers of vocational programs in Palm Beach, Broward and Dade counties in Southeastern Florida. These three standard metropolitan statistical areas account for over 90 percent of the economic activity in the Southeast Florida Economic Region as defined by the U. S. Department of Commerce.[1] Thus, they form a homogenous economic area and can be treated as a single but distinct labor market.

The three counties contain a population of over three million persons. Of these, about 1.25 million are in the labor force which represents a participation rate of less than 50 percent compared to over 60 percent nationwide.[2] The low participation rate reflects the role of Southeast Florida as a retirement center. About 540 thousand persons are 65 and over which is over one sixth of the total; one in ten residents of the nation as a whole are in this age group. Although the region has enjoyed rapid economic growth, due to the influx of over 500,000 persons since 1970, this study was undertaken of vocational completers who entered a labor market characterized by a historically high unemployment rate of 12 percent.

3.1 SELECTION OF INSTITUTIONS, RACE AND ETHNIC BACKGROUND

Two types of public institutions offer extensive post secondary vocational and technical education courses in the region: areawide vocational centers and community colleges. Each county contains two vocational centers and one community college (with several campuses). The total number of completers of programs in post secondary vocational and technical education from the nine institutions was 8,715 during the 1975-76 academic year (Table 3.1). Of these, about two-thirds attended the centers and one-third attended the colleges. Over 45 per cent attended institutions in Dade County, and over 40 per cent attended institutions in Broward.

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[1] U. S. Department of Commerce

[2] University of Florida, Florida Statistical Abstract

It was clearly desirable to sample students from both the colleges and the centers and it was decided to sample from each county to allow for any spatial variation within the three county area. Two of the centers, South Tech in Palm Beach and Miami Lakes in Dade, were very small and new. Because of this, they were eliminated from the sampling. This left two centers from Broward, and one from each of the other counties. The Atlantic center in Broward was less than half the size of the other center, Sheridan, and was eliminated, after it was concluded that its omission would not weaken the representativeness of the sample.

Table 3.2 contains a comparison of the race-ethnic distribution of completers in Atlantic and the retained centers (North Tech, Sheridan and Lindsey Hopkins). One consideration in the decision to omit Atlantic was whether its elimination would involve the exclusion of a large number of Blacks, Asians, Indians or Hispanics from the sample. As discussed below, it was determined that the centers as a group did not contain a sufficient number of Asians or Indians to justify statistical inferences about these races, even if all their members were included in the sample. The Hispanics were treated as White in the study because the Hispanic category was only available for the second year of the sample, and it was assumed that Hispanics were classified as White in the earlier year.

TABLE 3.1

NUMBERS OF COMPLETERS BY INSTITUTION 1975-76

	Palm Beach County	Broward County	Dade County	Total	Per Cent
Centers	624	3115	2122	5861	67.3
Colleges	545	468	1841	2854	32.7
Total	1169	3583	3963	8715	
%	13.4	41.1	45.5		

TABLE 3.2

RACE-ETHNIC DISTRIBUTION OF COMPLETERS IN ATLANTIC AND RETAINED CENTERS[a] 1975-76

	White	Black	Asian	Indian	Hispanic	Total
Atlantic No.	882	137	1	3	4	1027
%	85.88	13.34	.10	.29	.39	100.00
Retained Centers No.	3291	870	42	5	298	4506
%	73.04	19.31	.93	.11	6.61	100.00

[a] retained centers were North Tech, Sheridan, and Lindsey Hopkins.

Thus, the question of the cost of omitting Atlantic in terms of the representativeness of the sample boiled down to the White-Black distribution of Atlantic's completers. As can be seen from Table 3.2 Atlantic contains a significantly smaller percentage of Blacks than the other centers taken together. Since the Whites make up almost three fourths of the completers, any shortage of observations would involve blacks. Hence the omission of Atlantic imposed no significant cost by weakening the representativeness of the sample.

A second consideration in the decision to omit Atlantic was whether its elimination would involve the exclusion of vital observations on program areas. Would the exclusion of Atlantic so reduce the number of observations available for sampling in a program area, that the program area would have to be excluded? Table 3.3 contains the program area distribution of completers in Atlantic and the retained centers. It can be seen that Atlantic has relatively more completers in the health area, and relatively fewer in the industrial area than the other centers. The percentage of Atlantic's completers in the business and distributive areas is in line with the other centers. The one area where Atlantic has a disproportionate share of completers is health, and it is evident that should a problem of obtaining a minimum sample size arise, which could be solved by the inclusion of Atlantic, it would arise in the health area.

The numbers of White and Black completers in Atlantic and the retained centers are given in Table 3.4 for the three programs found in Atlantic. These programs were nurse's aide, practical nursing and hospital ward clerk. Because data were collected on two years of completers, the number of observations available for sampling from the retained centers should be doubled. It is clear from Table 3.4 that a sufficient

TABLE 3.3

PROGRAM AREA DISTRIBUTION OF COMPLETERS IN ATLANTIC AND RETAINED CENTERS[a]
1975-76

	Agri Business	Business	Distri-butive	Gainful Home-making	Health	Indus-trial	Total
Atlantic No.	0	214	229	6	454	124	1027
%	0	20.84	22.30	0.58	44.21	12.07	100.00
Retained No.	6	976	990	195	946	1393[b]	4506
%	13	21.66	21.97	4.33	21.00	30.91	100.00

[a] retained centers were North Tech, Sheridan and Lindsey Hopkins.
[b] includes 16 in Law Enforcement.

TABLE 3.4

THE NUMBERS OF WHITE AND BLACK COMPLETERS IN HEALTH PROGRAMS COMMON TO ATLANTIC AND RETAINED CENTERS[a] 1975-76

	Nurses Aide		Practical Nursing		Hospital Ward Clerk	
	White	Black	White	Black	White	Black
Atlantic	125	50	181	27	70	1
Retained Centers[b]	170	94	303	40	85	18
Atlantic Share %	42.37	43.86	37.40	40.30	45.16	5.26

[a] retained centers were North Tech, Sheridan and Lindsey Hopkins.
[b] Note that data were collected from two classes of completers so that the numbers of completers from the retained centers were in fact double the numbers reported in this table.

number of observations were retained for possible sampling after Atlantic was omitted.

It was decided to sample only completers that were classified as White (including Hispanic) and Black. This was because there were not enough Asian and Indian completers from all the centers taken together to permit statistical inferences about the population of Asian and Indian completers outside the region (Table 3.2). There were a significant number of Hispanics, but this category was not used in the race classification of 1974-75. Since most of these completers would have been previously classified as White, the Hispanics were included with the Whites in 1975-76.

The omission of Asian and Indian completers also made sense in terms of the community colleges where 14 of Asian or Indian background completed the occupational programs in 1975-76. It was also necessary to exclude an equally small group of non resident aliens because of size and difficulty in interpreting their background variables.

3.2 SELECTION OF PROGRAM AREAS

There was an insignificant number of completers from the agribusiness area in 1975-76 (Table 3.5). Thus, no completers from this area were surveyed. It was decided to eliminate gainful homemaking also, because of its relatively small size. It accounted for less than three percent of total completions. Although the public service area accounted for only 5.27 percent of the completers they almost all completed at the community colleges and so one source of variation (college versus center) could be removed. Hence, the public service area from the colleges only was included.

TABLE 3.5

NUMBERS OF COMPLETERS BY PROGRAM AREA 1975-76

	Centers		Colleges		Total	
	Number	Percent	Number	Percent	Number	Percent
Agriculture	6	0.13	11	0.40	17	0.23
Distributive	990	21.97	146	5.10	1136	15.43
Health	946	21.00	1544	54.10	2490	33.83
Home Economics	195	4.33	25	0.90	220	2.99
Business/Office	976	21.66	322	11.30	1298	17.64
Trade/Industrial	1377	30.56	418	14.60	1795	24.39
Public Service	16	0.35	388	13.60	404	5.49
Total	4506	100.00	2854	100.00	7360	100.00

On the other hand, it was decided not to include the distributive area from the community colleges because of its small size and variety of programs.[3] The resulting distribution of program areas by institution is given in Table 3.6.

Health is clearly the largest program area but this reflects its dominant position among the occupational programs offered by the community colleges. The trade/industrial area is the largest offered by the vocational centers and it is also significant at the community colleges. The distributive area is only included from the centers and only the public service programs from the colleges remain in the sample. Both types of institutions offer a significant number of business/office programs.

Sheridan, Lindsey Hopkins and Miami Dade each account for about one fourth of the completers. The remaining institutions each account for about seven percent. The numbers in Table 3.7 should be adjusted downward very slightly to allow for Asian, Indian and non resident completers at the community colleges.

A race sex breakdown of the completers in the selected program areas is given in Table 3.7. Over 85 percent are White and about 60 percent were female. Almost 99 percent of those in the public service area are White but this area accounts for little more than 5 percent of the total. In the largest program area (health) about 87 percent of the completers are White; the smallest White percentage is in the distributive area (79 percent). Thus, the program areas are predominantly White.

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[3] There were only four distributive programs offered at more than one college, and of these only one (hotel and lodging) had enough completers (75) to warrant inclusion in the study. Of these 29 were non resident aliens and 2 were Asians. The remaining 44 was too small to allow for race, sex and college variation even if a 100 percent response rate could be achieved.

TABLE 3.6

NUMBERS OF COMPLETERS BY SELECTED PROGRAM AREA AND INSTITUTION 1975-76

	Distri-butive	Health	Business/ Office	Trade/ Industrial	Public Service	Total	Percent
North Tech	0	56	116	324	0	0	7.17
Sheridan	432	551	512	481	0	1976	28.58
Lindsey Hopkins	546	336	344	544	0	1770	25.60
(Centers)	(978)	(943)	(972)	(1349)	0	(4242)	(61.35)
Palm Beach	0	225	28	60	198	511	7.39
Broward	0	193	77	62	103	435	6.29
Miami Dade	0	1126	217	296	87	1726	24.97
(Colleges)	(0)	(1544)	(322)	(418)	(388)	(2672)	(38.65)
Total	978	2487	1294	1767	388	6914	100.00[a]
Percent	14.14	35.97	18.72	25.56	5.61	100.00[b]	

[a] total of column percentages.
[b] total of row percentages.

TABLE 3.7

NUMBERS OF COMPLETERS BY SELECTED PROGRAM AREA, RACE AND SEX 1975-76

	Distributive	Health	Business/ Office	Trade/ Industrial	Public Service	Total	Percent
White Male	259	720	112	1052	332	2475	36.12
White Female	511	1445	955	408	46	3365	49.10
(White)	(770)	(2165)	(1067)	(1460)	378	(5840)	(85.22)
Black Male	45	52	23	205	3	328	4.78
Black Female	163	261	203	56	2	685	10.00
(Black)	(208)	(313)	(226)	(261)	(5)	(1013)	(14.78)
Male	304	772	135	1257	335	2803	40.90
Female	674	1706	1158	464	48	4050	59.10
Total[a]	978	2478	1293	1721	383	6853	100.00[b]
Percent	14.27	36.16	18.87	25.11	5.59	100.00[c]	

[a] College totals exclude Asians, Indians and Aliens. Atlantic excludes Public Service figures which therefore differ slightly from Table 3.6.
[b] total of column percentages.
[c] total of row percentages.

About 90 percent of the completers in the business/office area are female; close to 70 percent of the completers in the distributive and health areas are also female. In the trade area less than 30 percent are female and only one out of every 8 completers in the public service area is female. Thus, one can say that the typical completer is White; the typical distributive, health and business/office completer is a White female; and the typical trade/industrial and public service completer is a White male.

Tables 3.8 and 3.9 give the race-sex breakdown of the program areas at the centers and colleges. Both types of institutions are predominantly White, especially the colleges. The centers are predominantly female but more than 50 percent of the completers at the colleges were male. The health program area at the centers is considerably more female than its counterpart at the colleges.

3.3. SELECTION OF PROGRAMS

3.3.1 HEALTH AREA

The program areas were too heterogeneous to form the basis for sampling, while many of the programs were too small to be separately sampled. It was necessary, therefore, to sample completers from individual programs within each area.

It was also regarded as desirable to sample a program or program area in at least two centers or at least two colleges to prevent unusual conditions in one institution from biasing the results.

The fourteen programs in each of the vocational centers from the health area in 1975-76 are given in Table 3.10. Seven of the programs were only provided by one center and three programs had no completers at all. The operating room technician program was offered at two centers but the number of completers (19) was too small for inclusion in the study.

TABLE 3.8

NUMBERS OF VOCATIONAL CENTER COMPLETERS BY SELECTED PROGRAM AREA, RACE AND SEX 1975-76

	Distributive	Health	Business/ Office	Trade/ Industrial	Total	Percent
White Male	259	98	51	782	1190	28.06
White Female	511	662	751	324	2248	52.99
(White)	(770)	(760)	(802)	(1106)	(3438)	(91.05)
Black Male	45	13	14	189	261	6.15
Black Female	163	170	156	54	543	12.80
(Black)	(208)	(183)	(170)	(243)	(804)	(18.95)
Male	304	111	65	971	1451	34.21
Female	674	832	907	378	2791	65.79
Total	978	943	972	1349	4242	100.00[a]
Percent	23.06	22.22	22.91	31.80	100.00[b]	

[a] sum of column percentages

[b] sum of row percentages

TABLE 3.9

NUMBERS OF COMMUNITY COLLEGE COMPLETERS BY SELECTED PROGRAM AREA, RACE AND SEX 1975-76

	Health	Business/ Office	Trade/ Industrial	Public Service	Total	Percent
White Male	622	61	270	332	1285	49.21
White Female	783	204	84	46	1117	42.78
(White)	(1405)	(265)	(354)	(378)	(2402)	(91.99)
Black Male	39	9	16	3	67	2.57
Black Female	91	47	2	2	142	5.44
(Black)	(130)	(56)	(18)	(5)	(209)	(8.01)
Male	661	70	286	335	1352	51.78
Female	874	251	86	48	1259	48.22
Total	1535	321	372	383	2611	100.00[a]
Percent	58.79	12.29	14.25	14.67	100.00[b]	

[a] sum of column percentages.
[b] sum of column percentages.

TABLE 3.10

NUMBER OF HEALTH COMPLETERS BY PROGRAM IN THE CENTERS 1975-76

	No. Tech	Sheridan	Lindsey	Total
Practical Nursing	56	257	86	399
Nurse's Aide	0	136	72	208
Hospital Ward Clerk	0	79	24	103
Hospital Admitt Clerk	0	0	12	12
Medical Lab Assist	0	67	0	67
Dental Lab Tech	0	0	33	0
Dental Assistant	0	0	0	0
Medical Assistant	0	0	14	14
Ophthalmic Dispenser	0	0	0	0
Operating Room Technician	0	12	7	19
Inhalation Therapist	0	0	0	0
Physical Therapists' Aide	0	0	41	41
Masseur	0	0	37	37
Hospital Housekeeper	0	0	10	10
TOTAL	56	551	336	943

Thus, nurse's aide, practical nursing and hospital ward clerk were included in the study.

At the community colleges there are 9 HEGIS Codes in the Health area (Table 3.11) but only three had more than 100 completers (Dental, Nursing and miscellaneous health education). It was decided to select programs from each of these three program groups. These accounted for 88.5 percent of the completers in health.

One program in each of the groups accounts for over 50 percent in that group (Table 3.12) and these were the programs that were selected. The Dental Hygiene program had 62 completers and accounted for 54.4 percent of the completers in that group. This number is relatively small but the program was only offered at two of the three centers and it was desired to include some coverage of the dental area. The 471 completers of the nursing degree programs accounted for 81.9 percent of the nursing programs.

Over 85 percent of the completers from the miscellaneous health education group were from one program (emergency medical technology) at one college (Miami Dade). It was decided to relax the principle of only including programs available at more than one college in this one case because of the program's size. The 577 completers accounted for over 37 percent of all completers in the health area at all colleges and accounted for over 20 percent of all completers of all the programs at all the colleges.

3.3.2 BUSINESS/OFFICE AREA

The programs in each of the centers from the Business area in 1975-76 are given in Table 3.13. It was decided to group the programs into three subareas: payroll-personnel, secretarial skills and data

TABLE 3.11

NUMBER OF COMMUNITY COLLEGE COMPLETERS OF PROGRAM GROUPS IN THE HEALTH AREA 1975-76

	HEGIS[a]	PALM BEACH	BROWARD	MIAMI DADE	TOTAL	PERCENT
Dental	12301	74	13	27	114	7.4
Medical Lab Tech	12302	10	3	38	51	3.5
Nursing	12303	113	152	308	573	37.2
Rehabilitation	12304	11	0	20	31	2.0
Radiology	12305	0	2	24	26	1.7
Ophthalmic	12306	0	0	20	20	1.4
Mental Health	12308	17	0	12	29	1.9
Misc Health Ed	12309	0	20	656	676	43.9
Health Occupations Education Others	12399	0	0	15	15	1.0
Total	123	225	190	1120	1535	100.0

[a] HEGIS codes are the numbers used to identify programs in the classification system used by the Florida Division of Community Colleges.

TABLE 3.12

NUMBERS OF COMPLETERS OF PROGRAMS IN THE DENTAL, NURSING AND MISCELLANEOUS HEALTH EDUCATION GROUPS 1975-76

	HEGIS[a]	Palm Beach	Broward	Miami Dade	Total	Percent
Dental Assisting	1230101	25	13	0	38	33.3
Dental Hygiene	1230102	35	0	27	62	54.4
Dental Lab Technol	1230103	14	0	0	14	12.3
(Dental)	12301	(74)	(13)	(27)	(114)	(100.0)
Nursing Degree	1230301	113	152	204	471	81.9
Practical Nursing	1230302	0	0	84	84	14.6
Operating Room Tech	1230305	0	0	20	20	3.5
(Nursing)	12303	(113)	(152)	(308)	(573)	(100.0)
Electroenceph Tech	1230901	0	0	8	8	1.2
Respiratory Therapy	1230903	0	7	23	31	4.6
Medical Asst Office	1230904	0	13	0	13	2.0
Emergency Med Tech	1230907	0	0	577	577	85.1
Dietetic Tech	1230908	0	0	0	0	0
Mortuary Sci	1230909	0	0	48	48	7.1
Veterinary Asst	1230912	0	0	0	0	0
(Misc. Health Ed.)	12309	(0)	(20)	(656)	(676)	(100.0)

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[a] HEGIS codes are the numbers used to identify programs in the classification system used by the Florida Division of Community Colleges.

TABLE 3.13
NUMBERS OF COMPLETERS OF PROGRAMS IN THE BUSINESS/OFFICE AREA AT THE VOCATIONAL CENTERS 1975-76

	No. Tech.	Sheridan	Lindsey	Total
Bookkeeping I	12	1	32	45
Bookkeeping II	22	23	0	45
Payroll Clerk	0	0	1	1
Business Math	0	0	7	7
Business Ed Job Trg	0	110	0	110
Business Comm	11	0	3	14
Accountancy	0	0	0	0
Human Relations	0	2	0	2
Coop Bus on Job	0	0	0	0
Typewriting Beg	6	42	102	150
Typewriting Infer	0	0	0	0
Typewriting Adv	7	0	10	17
Shorthand Beg	14	0	12	26
Shorthand lutes	0	0	0	0
Shorthand Adv	0	0	0	0
Shorthand Mach	0	0	10	10
Stenoscript	0	0	0	0
Dictation/Transc	6	42	8	56
Filing	0	0	1	1
Clerical Off Pract	13	119	25	157
Sec Office Pract	0	32	21	53
Vos Office Pract	0	0	0	0
Voc Office Ed Clk	0	0	0	0
Voc Office Ed Sec	0	0	0	0
Records Manager	9	0	0	9
Leg Sec Trg	0	44	0	44
Med Sec Trg	0	90	25	115
Sec Adm Med Leg	9	0	0	9
Office Mgmt	0	0	0	0
Punch Card Data Proc	0	7	35	42
Data Proc TC	0	0	18	18
Bus Mach	7	0	34	41
TOTAL	126	512	334	972

machines. One program was selected from each of the three subareas: bookkeeping, typewriting, and business machines. The bookkeeping programs were aggregated, as were the typewriting programs.

There were six programs available in the business/office area at the community colleges (Table 3.14). Students completed only four of the six program groups available. Of these, two are too small for inclusion in the study. Thus, only the stenographic and secretarial, and management program groups could be included.

Four programs are listed in the stenographic and secretarial area (Table 3.15). Of these, there were no completers in stenography, and secretarial accounted for 73.8 percent. The completers of the group were not assigned to individual programs and so all were included even through they may be somewhat heterogeneous. Thus, secretarial science and management were the programs selected from the office area.

3.3.3 TRADE/INDUSTRIAL AREA

The programs in each of the centers from the trade/industrial area in 1975-76 are given in Table 3.16. There is a wide variety of individual programs but following the criterion that programs selected should be offered at more than one center, many of the small programs could be eliminated. Three relatively large programs were offered at practically all the centers, and were selected for inclusion in the study, namely, air conditioning, auto mechnaics and cosmetology.

At the community colleges there were more programs offered in the trade and industrial area than in any other. There were ten groups (Table 3.17) but only two had 80 or more completers. It was therefore decided to include only the aviation and electronics groups. These

TABLE 3.14

NUMBER OF COMMUNITY COLLEGE COMPLETERS OF PROGRAM GROUPS IN OFFICE AREA 1975-76

	HEGIS[a]	Palm Beach	Broward	Miami Dade	Total
Accounting	12501	0	10	38	38
Business Data Process	12502	1	8	8	17
Personnel & Training	12506	0	0	0	0
Stenography & Secretarial	12507	14	37	89	140
Management	12508	11	21	84	116
Clerk Typing	12509	0	0	0	0
Total	125	26	76	219	321

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[a] HEGIS codes are the numbers used to identify programs in the classification system used by the Florida Division of Community Colleges.

TABLE 3.15

NUMBERS OF COMPLETERS OF PROGRAMS IN THE STENOGRAPHIC AND SECRETARIAL, AND MANAGEMENT GROUPS OF THE OFFICE PROGRAM AREA 1975-76

	HEGIS[a]	Palm Beach	Broward	Miami Dade	Total
Executive Secretary	125701	0	32	0	32
Secretarial	125702	14	5	84	108
Stenography	125703	0	0	0	0
Court Reporting	125706	0	0	5	5
(Stenog. & Secret.)	12507	(14)	(37)	(89)	(140)
Unassigned Management	1250800	11	21	84	116
(Management)	12508	(11)	(21)	(84)	(116)

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[a] HEGIS codes are the numbers used to identify programs in the classification system used by the Florida Division of Community Colleges.

TABLE 3.16

NUMBER OF COMPLETERS IN THE VOCATIONAL CENTER TRADE/INDUSTRIAL AREA

1975-76

	No. Tech	Sheridan	Lindsey	Total
Air Cond/Heating	5	22	64	91
Masonry	11	2	0	13
Carpentry	6	14	0	20
Electric Wiring	5	0	0	5
Cabinet Making	6	0	0	6
Upholstering	0	0	0	0
Apparel Manufacture	0	0	8	8
Power Sewing	0	0	0	92
Printing	10	0	0	10
Drafting	10	18	12	40
Commercial Art	16	0	31	47
Photography	0	0	30	30
Communications	0	0	18	18
TV Production	7	0	0	7
Motor General	0	0	9	9
Auto Body Repair	20	59	0	79
Auto Mechanic	21	183	0	204
Elect Chassis Manufacture	0	0	54	54
Welding	10	0	0	10
Gas Engine Mechanic	6	0	0	6
Indust Electronics	0	35	37	72
Electron Technology	9	0	0	9
Watch Making	0	0	9	9
Sheet Metal	0	0	0	0
Machine Shop	3	37	0	40
Tool Room Management	0	0	0	0
Appliance Repair	0	0	3	3
Radio TV Service	7	0	25	32
Bus Mach Maintenance	0	0	8	8
Cosmetology	59	106	40	205
Commercial Cooking	16	0	71	87
Meat Cutting	0	0	31	31
Indus Supervisor	0	0	2	2
Custodial Service	8	0	0	8
SIE	89	5	0	94
TOTAL	324	481	544	1347

TABLE 3.17

NUMBERS OF COMMUNITY COLLEGE COMPLETERS OF PROGRAM GROUPS IN TRADE/INDUSTRIAL AREA 1975-76

	HEGIS	Palm Beach	Broward	Miami Dade	Total
Air Cond/Envir Cont	12601	21	0	24	45
Aviation	12604	2	10	63	75
Commercial Art	12607	1	3	40	44
Commercial Fish & Oceanog.	12608	0	0	6	6
Construction & Maintenance	12610	16	6	10	32
Drafting & Design	12613	13	0	4	17
Electrical	12614	0	0	4	4
Electronics	12615	0	27	74	101
Graphic Arts	12619	2	0	17	19
Other Engin & Tech	12625	0	14	15	29
Total	126	55	60	257	372

accounted for just under 50 percent of the completers, a much smaller share of the program area than the retained program groups in the health and office areas. The problem was aggravated because it was not possible to include the aviation group as a result of the analysis below.

Numbers of completers of the programs in the aviation and electronic groups are given in Table 3.18. Once again there is a sizeable number of different programs in each group. Thus each program is small. The only program that approaches the minimum size in the aviation group is airline careers but only one college has sufficient completions for inclusion (Miami-Dade). The 38 Miami-Dade completions came from three different courses and thus itwas necessary to exclude this program and hence the aviation group.

The electronics technology program was selected from the electronics group because, although small, it was offered at two colleges. This was the only program included from the trade and industrial area and, thus, the sample included from this area was unavoidably weak.

3.3.4 DISTRIBUTIVE AREA

Programs from the distributive area were only included from the centers. The programs in each of the centers from the distributive area in 1975-76 are given in Table 3.19. There were no distributive programs in North Tech. It would be possible to group the hotel-motel programs and the real estate programs as indicated in Table 3.19. However, two of the hotel-motel programs accounted for most of the completers in that area and were relatively homogeneous. Waiter-waitress, cashiering, insurance, export-import, fleet management, and establish new business were offered only at Lindsey. The real estate courses were heterogeneous and diverse. It was therefore decided to select hotel-motel office procedures and PBX,

TABLE 3.18

NUMBERS OF COMPLETERS OF PROGRAMS IN THE AVIATION AND ELECTRONIC GROUPS OF THE TRADE AND INDUSTRIAL PROGRAM AREA
1975-76

	HEGIS	Palm Beach	Broward	Miami Dade	Total
Unassigned Aviation	1260400	2	0	1	3
Airtraffic Controller	1260402	0	3	8	11
Pilot	1260404	0	2	18	20
Aviation Administ	1260405	0	2	0	2
Airline Careers	1260499	0	3	39	39
(Aviation)	12604	(2)	(10)	(63)	(75)
Unassigned Electronics	1261500	0	0	0	0
Communications Electronics	1261601	0	7	26	33
Electronics Tech	1261504	0	20	47	67
Electromechanical Tech	1261505	0	0	1	1

TABLE 3.19

NUMBERS OF COMPLETERS IN THE DISTRIBUTIVE AREA AT THE VOCATIONAL CENTERS 1975-76

	Sheridan	Lindsey	Total
Hotel Motel Auditing	158	54	212
Hotel Motel Cash	0	0	0
Hotel Motel Law	0	0	0
Hotel Motel Management	0	26	26
Hotel Motel Office Proc	66	50	116
Hotel Motel PBX	183	150	333
Waiter-Waitress	0	56	56
Travel Agency Ticketing	18	40	58
Cashering	0	121	121
Real Estate License	0	8	8
Real Estate Law	0	0	0
Real Estate Appraisal	0	0	0
Real Estate Management	0	0	0
Insurance	0	15	15
Export-Import	0	26	26
Fleet Management	0	0	0
Estab New Business	7	0	7
Total	432	546	978

and travel agency ticketing from the distributive group.

3.3.5 PUBLIC SERVICE AREA

Programs in the public service area were only included from the community colleges. Students completed in only six of the thirteen program groups in the area (Table 3.20). One of these groups dominated the area (police science) with 82.5 percent of the total number of completers. This was the group selected for inclusion in the study.

The HEGIS numbering of police science programs is not standard across colleges but all appear to have law enforcement degree and certificate programs (Table 3.21).[4] Palm Beach Junior College has a sizeable program for police recruits not offered by the others; Broward has a sizeable criminal justice program not available elsewhere. Thus, the only significant program offered everywhere was the law enforcement degree program and this was included in the study.

The public service program included in the study (law enforcement degree) accounted for a small share of total completers (just over one-fourth) but the sample from this area is probably quite strong. The reason is that most of the completions are in the police science group, as is law enforcement degree. Thus, the excluded programs from the police science group may be well represented by the program that is included.

In conclusion, programs were selected from five program areas at the vocational centers and community colleges (Table 3.22). Three programs were selected from the health, business/office, trade/industrial and distributive areas at the centers; two programs were selected from the health and business/office areas, and one each from the trade/industrial and public services at the community colleges. No programs were selected

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[4] HEGIS codes are the numbers used to identify programs in the classification system used by the Florida Division of Community Colleges.

TABLE 3.20

NUMBERS OF COMMUNITY COLLEGE COMPLETERS OF PROGRAMS IN THE PUBLIC SERVICE AREA 1975-76

	HEGIS	Palm Beach	Broward	Miami Dade	Total
Fire Science	1263801	1	18	29	48
Police Science	1262802	195	81	42	318
Recreational Leadership	1262803	0	0	1	1
Library Technician	1262804	0	0	0	0
Probation Officer	1262806	0	0	0	0
Teachers Aide	1262807	0	1	11	12
Group Living	1262808	0	0	0	0
Corrections	1262809	0	0	0	0
Legal Assistant	1262811	0	0	0	0
Waste Water	1262899	0	0	0	0
Music	1269900	1	0	0	1
Meterology	1269905	0	0	0	0
Mechanical Tech	1269906	0	0	4	4
Total	126	196	100	87	383

TABLE 3.21

NUMBERS OF COMPLETERS OF PROGRAMS IN THE POLICE SCIENCE GROUP OF PUBLIC SERVICE AREA PROGRAMS

	HEGIS	Palm Beach	Broward	Miami Dade	Total
Law Enforcement Degree	12628021	50	16	37	103
Law Enforcement Cert	12628022	3	3*	4**	10
Corrections Degree	12628023	11	0	0	11
Corrections Cert.	12628024	0	0	0	0
Police Recruit Prog	12628025	130	0	0	130
Security Degree	12628026	0	0	0	0
Security Cert	12628027	1	0	0	1
Crime Science Tech	12628022	0	0	0	0
Criminal Justice	12628023	0	62	0	62
Police ID	12628022	0	0	1	1
Trainees	12628024	0	0	0	0
Total	1262802	195	81	42	318

*HEGIS No. 1268024

**HEGIS No. 1268023

TABLE 3.22

SELECTED PROGRAMS FROM THE VOCATIONAL CENTERS AND COMMUNITY COLLEGES

Program Area	Center Programs	College Programs
Health	Nurse's Aide Practical Nursing Hospital Ward Clerk	Dental Hygiene Nursing Degree Emergency Medical Technology
Business/Office	Bookkeeping Typewriting Business Machines	Secretarial Science Management
Trade/Industrial	Air Conditioning Auto Mechanics Cosmetology	Electronic Technology
Distributive	Hotel Office Hotel PBX Travel Ticketing	No Programs
Public Service	No Programs	Police Science

from the public service area at the centers or the distributive area at the colleges.

3.4 COVERAGE OF THE POPULATION BY THE SELECTED PROGRAMS

The extent to which the selected programs cover the program areas is given by Table 3.23. The selected programs account for over 50 percent of all completers in the program areas at the six institutions. Coverage is somewhat better at the colleges than the centers; coverage of the health area is over 70 percent, average of the distributive area is close to 50 percent of the business/office and trade/industrial is about one third and is less than 30 percent of the public service area.

The race coverage of the selected programs is given in Table 3.24. The race breakdown of the selected programs closely matches the race breakdown of the program areas as a whole but there is a moderate over representation of females. The trade/industrial and distributive areas have an over representation of females relative to the totality of their programs but this is almost balanced by an excess of males in the health, business/office and public service areas.

On the basis of this analysis it appeared that the selected programs provided adequate coverage of the population, particularly in their race and sex characteristics. The analysis was performed on the 1975-76 data set. The study also included a sample from 1974-75 to eliminate sensitivity to a single year's circumstances and to provide some basis for inferring the stability of the results over time.

The remainder of this section presents the profile of the 1974-75 data set and sampled programs. There was a decline of about 500 or 7 percent in the number of completers between 1974-75 and 1975-76 as can be seen from Table 2.25. The total number of completers at the three centers remained about the same but there was a decline of about 500 at the

TABLE 5.23

NUMBER OF COMPLETERS IN SELECTED PROGRAMS 1975-76

Program Area		Center Programs[b]		College Programs[b]	
Health[a]		Nurse's Aide	N = 208	Dental Hygiene	N = 62
Center Programs	N = 943	Practical Nursing	N = 399	Nursing Degree	N = 469
College Programs	N =1535	Hospital Ward Clerk	N = 103	Emerg. Med Tech	N = 577
Subtotal	S_1=2478	Subtotal	Σ_1= 710	Subtotal	T_1=1108
				Area Total[c]	Σ_1+T_1=1818
Business/Office		Bookkeeping	N = 90	Secretarial Science	N = 108
Center Programs	N = 972	Typewriting	N = 167	Management	N = 116
College Programs	N = 321	Business Machines	N = 41	Subtotal	T_2= 224
Subtotal	S_2=1293	Subtotal	Σ_2= 298	Area Total[c]	Σ_2+T_2= 522
Trade/Industrial		Air Conditioning	N = 91	Electronic Tech	N = 67
Center Programs	N =1349	Auto Mechanic	N = 204	Subtotal	T_3= 67
College Programs	N = 372	Cosmetology	N = 205	Area Total[c]	Σ_3+T_3= 567
Subtotal	S_3=1721	Subtotal	Σ_3= 500		
Distributive		Hotel Office	N = 116	No Programs	N = 0
Center Programs	N = 978	Hotel PBX	N = 333	Subtotal	T_4= 0
College Programs	N = 0	Travel Ticketing	N = 58	Area Total[c]	Σ_4+T_4= 507
Subtotal	S_4= 978	Subtotal	Σ_4= 507		
Public Service		No Programs	Σ_5= 0	Police Science	N = 103
Center Programs	N = 0			Subtotal	T_5= 103
College Programs	N = 383			Area Total[c]	Σ_5+T_5= 103
Subtotal	S_5= 383				
All Areas					
Center Programs	N =4242	Center Programs	Σ =2015	Center Programs	47.50%
College Programs	N =2611	College Programs	T =1502	College Programs	57.53%
Total	S =6853	Total	Σ+T =3517	Total	51.32%

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[a] This column represents the total number of completers in all programs in each program area.
[b] This column represents the number of completers in the selected programs from each program area.
[c] The sum of the completers from the colleges and the centers.

TABLE 3.24

RACE AND SEX COVERAGE OF SAMPLE PROGRAMS

	White Male	White Female	All White	Black Male	Black Female	All Black	All Male	All Female	Total
Health Sampled	559	1053	1012	25	181	206	584	1234	1818
Health All	720	1445	2165	52	261	313	772	1706	2478
Sampled %	77.64	72.87	74.46	48.08	69.35	65.81	75.65	72.33	73.37
Bus/Off Sampled	65	325	390	19	113	132	84	438	522
Bus/Off All	112	955	1067	23	203	226	135	1158	1293
Sampled %	58.04	34.03	36.55	82.61	55.67	58.41	62.22	37.82	40.37
Tech/Ind Sampled	332	170	502	48	17	65	380	187	567
Tech/Ind All	1052	408	1460	205	56	261	1257	464	1721
Sampled %	31.56	41.67	34.38	23.41	30.36	24.90	30.23	40.30	32.95
Distributive Sampled	104	302	406	18	83	101	122	385	507
Distributive All	259	511	770	45	163	208	304	674	978
Sampled %	40.15	59.10	52.73	40.00	50.92	48.56	40.13	57.12	51.84
Pub Serv Sampled	95	7	102	1	0	1	96	7	103
Pub Serv All	332	46	378	3	2	5	335	48	383
Sampled %	28.61	15.22	26.98	33.33	0.00	20.00	28.66	14.58	26.89
All Programs Sampled	1155	1857	3012	111	394	505	1266	2251	3517
All Programs	2475	3365	5840	328	685	1013	2803	4050	6853
Sampled %	46.67	55.19	33.84	57.52	49.85	49.85	45.16	55.58	51.32

TABLE 3.25
NUMBERS OF
COMPLETERS OF SELECTED PROGRAM AREAS 1974-75 AND 1975-76

	1974-75			1975-76		
	Centers	Colleges	Total	Centers	Colleges	Total
Health	1212	1524	2736	946	1544	2490
Business/Office	1286	485	1771	976	322	1298
Trade/Industrial	1003	589	1592	1377	418	1795
Distributive	868	0	868	990	0	990
Public Service	0	548	548	0	388	388
Total	4369	3146	7515	4289	2672	6961

colleges. The business/office area had the largest decline (1500) and the trade/industrial area had the largest increase (400).

3.5 SELECTION OF THE COMPLETERS SURVEYED

Once the programs had been selected in the manner outlined above it remained to select the completers to be surveyed. The sampling frame is given in Tables 3.26 and 3.27. For several reasons, however, the sampling frame for the community colleges contained fewer selectable subjects than given in Table 3.27. The data in that table came from the placement and follow up forms submitted to Tallahassee. The actual sampling frame was the list of completers stored electronically at each of the institutions.[5] This differed from the Tallahassee information because the information retained for storage on the computer does not always correspond to the information required by Tallahassee. Thus, a large number of computer records were found where the sex and/or race of the student was not available. Since the sample was stratified by race and sex, only records where the sex and race were known were selected for the sample. There appeared to be a very small number of misclassifications on the computer records.[6]

Special problems arose in relation to the emergency medical technology program at Miami-Dade. This is a course rather than a major so completers do not show up as graduates of the college. No 1974-75 list of completers was available and only limited information was available on the 1975-76 class. Sex had to be guessed at using the first name on the incomplete list of students obtained.

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[5] This problem did not arise at the vocational centers because of the centralized record keeping by the Division of Vocational Education.

[6] For example, males named Ruth and Susan.

TABLE 3.26

SAMPLING FRAME FOR THE SELECTED PROGRAMS AT THE VOCATIONAL CENTERS[a]

	NORTH TECH										
	BK	TW	BM	B/O	PN	H	AC	AM	CY	T/I	Σ
1974-75											
White Male	0	0	2	2	1	1	5	14	2	21	24
White Female	0	14	7	21	45	45	0	0	54	54	120
Total Whites	0	14	9	23	46	46	5	14	56	75	144
Black Male	0	0	0	0	0	0	1	3	1	5	5
Black Female	0	10	3	13	3	3	0	0	6	6	22
Total Blacks	0	10	3	13	3	3	1	3	7	11	27
Total	0	24	12	36	49	49	6	17	63	86	171
Total Males	0	0	2	2	1	1	6	17	3	26	29
Total Females	0	24	10	34	48	48	0	0	60	60	142
1975-76											
White Male	0	0	0	0	0	0	4	17	1	22	22
White Female	26	11	5	42	46	46	0	0	50	50	138
Total Whites	26	11	5	42	46	46	4	17	51	72	160
Black Male	1	0	0	1	2	2	1	3	0	4	7
Black Female	7	2	2	11	8	8	0	1	8	9	28
Total Blacks	8	2	2	12	10	10	1	4	8	13	35
Total	34	13	7	54	56	56	5	21	59	85	195
Total Males	1	0	0	1	2	2	5	20	1	26	29
Total Females	33	13	7	53	54	54	0	1	58	59	166

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[a] For an explanation of abbreviations see end of the table.

TABLE 3.26

SAMPLING FRAME FOR THE SELECTED PROGRAMS AT THE VOCATIONAL CENTERS CONTINUED

	SHERIDAN																
	BK	TW	BM	B/O	HO	HF	TT	D	PN	NA	HW	H	AC	AM	CY	T/I	Σ
1974-75																	
White Male	6	2	6	14	20	5	19	44	6	4	0	10	43	145	0	188	256
White Female	48	94	52	194	34	154	99	287	185	174	105	464	0	4	59	63	1008
Total Whites	54	96	58	208	54	159	118	331	191	178	105	474	43	149	59	251	1264
Black Male	1	1	2	4	1	0	1	2	0	1	0	1	1	7	0	8	15
Black Female	4	8	8	20	4	20	0	24	27	95	12	134	0	0	4	4	182
Total Blacks	5	9	10	24	5	20	1	26	27	96	12	135	1	7	4	12	197
Total	59	105	68	232	59	179	119	357	218	274	117	609	44	156	63	263	1461
Total Male	7	3	8	18	21	5	20	46	6	5	0	11	44	152	0	196	271
Total Female	52	102	60	214	38	174	99	311	212	269	1175	98	0	4	63	67	1190
1975-76																	
White Male	3	1	0	4	20	3	4	27	13	8	0	21	21	163	12	196	248
White Female	18	34	0	52	39	149	13	201	223	82	69	374	0	2	93	95	722
Total Whites	21	35	0	56	59	152	17	228	236	90	69	395	21	165	105	291	970
Black Male	0	0	0	0	3	2	0	5	0	0	0	0	1	18	0	19	24
Black Female	3	7	0	10	4	29	1	34	21	46	10	77	0	0	1	1	122
Total Blacks	3	7	0	10	7	31	1	39	21	46	10	77	1	18	1	20	146
Total	24	42	0	66	66	183	18	267	257	136	79	472	22	183	106	311	1116
Total Male	3	1	0	4	23	5	4	32	13	8	0	21	22	181	12	215	272
Total Female	21	41	0	62	43	178	14	235	244	128	79	451	0	2	94	96	844

TABLE 3.26

SAMPLING FRAME FOR THE SELECTED PROGRAMS AT THE VOCATIONAL CENTERS CONTINUED

								LINDSEY								
	BK	TW	BM	B/O	HO	HP	TT	D	PN	NA	HW	H	AC	CY	T/I	Σ
1974-75																
White Male	25	12	20	57	14	48	29	91	3	7	5	14	17	1	18	180
White Female	31	115	42	188	11	48	33	92	77	42	5	124	0	14	14	418
Total Whites	56	127	62	245	25	96	62	183	80	49	9	138	17	15	32	598
Black Male	9	8	14	31	1	3	9	13	2	5	1	8	9	1	10	62
Black Female	21	74	29	124	1	35	8	44	50	95	17	159	0	3	3	330
Total Blacks	30	82	43	155	2	38	17	57	49	100	18	167	9	4	13	392
Total	86	209	105	400	27	134	79	240	129	149	27	305	26	19	45	990
Total Male	34	20	34	88	15	51	38	104	5	12	5	22	26	2	28	242
Total Female	52	189	71	312	12	83	41	136	124	137	22	283	0	17	17	748
1975-76																
White Male	8	7	7	22	27	37	13	77	3	3	5	11	50	7	57	167
White Female	7	65	19	91	14	65	22	101	64	31	11	106	0	25	25	323
Total Whites	15	72	26	113	41	102	35	178	67	34	16	117	50	32	82	490
Black Male	9	2	0	11	4	8	1	13	1	0	1	2	14	1	15	41
Black Female	8	38	8	54	5	40	4	49	18	38	7	63	0	7	7	173
Total Blacks	17	40	8	65	9	48	5	62	19	38	8	65	14	8	22	214
Total	32	112	34	178	50	150	40	240	86	72	24	182	64	40	104	704
Total Male	17	9	7	33	31	45	14	90	4	3	6	13	64	8	72	208
Total Female	15	103	27	145	19	105	26	150	82	69	18	169	0	32	32	496

TABLE 3.26

SAMPLING FRAME FOR THE SELECTED PROGRAMS AT THE VOCATIONAL CENTERS

	CENTERS				
	B/O	D	H	T/I	Σ
1974-75					
White Male	73	135	25	227	460
White Female	403	279	633	131	1446
Total Whites	476	514	658	358	2006
Black Male	35	15	9	23	82
Black Female	157	68	296	13	534
Total Blacks	192	83	305	36	616
Total	668	597	963	394	2622
Total Male	108	150	34	250	542
Total Female	560	447	929	144	2050
1975-76					
White Male	26	104	32	275	437
White Female	185	302	526	170	1183
Total Whites	211	406	558	445	1620
Black Male	12	18	4	38	72
Black Female	75	83	148	17	323
Total Blacks	87	101	152	55	395
Total	298	507	710	500	2015
Total Male	38	122	36	313	509
Total Female	260	385	674	187	1506

ABBREVIATIONS USED IN TABLE 3.26

AC = air conditioning
AM = auto mechanic
B/O = business/office programs
BK = bookkeeping
CY = cosmetology
D = distributive programs
H = health programs
HO = hotel office procedures
HP = hotel PBX
HW = industrial ward clerk
NA = nurses aide
PN = practical nursing
T/I = trade/industrial programs
TT = travel agency ticketing
TW = typewriting
Σ = all programs

TABLE 3.27

SAMPLING FRAME FOR THE SELECTED PROGRAMS AT THE COMMUNITY COLLEGES AND OVERALL

	PALM BEACH									BROWARD									
	DH	RN	H	SS	OM	T/O	PS	P	Σ	RN	H	SS	OM	B/O	ET	T/I	PS	P	Σ
1974-75																			
White Male																			
White Female																			
Total Whites	DETAIL NOT AVAILABLE									DETAIL NOT AVAILABLE									
Black Male																			
Black Female																			
Total Blacks																			
Total	38	116	154	11	7	18	48	48	220	183	183	1	2	3	0	0	40	40	226
Total Males																			
Total Females																			
1975-76																			
WM	0	2	2	0	5	5	47	47	54	6	6	0	9	9	18	18	14	14	47
WF	35	108	143	13	6	19	2	2	164	140	140	5	8	13	0	0	2	2	155
W	35	110	145	13	11	24	49	49	218	146	146	5	17	22	18	18	16	16	202
BM	0	0	0	0	0	0	1	1	1	0	0	0	0	0	2	2	0	0	2
BF	0	3	3	1	0	1	0	0	4	6	6	0	4	4	0	0	0	0	10
B	0	3	3	1	0	1	1	1	5	6	6	0	4	4	2	2	0	0	12
T	35	113	148	14	11	25	50	50	223	152	152	5	21	26	20	20	16	16	214
M	0	2	2	0	5	5	48	48	55	6	6	0	9	9	20	20	14	14	49
F	35	111	146	14	6	20	2	2	168	146	146	5	12	17	0	0	2	2	165

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[a] For an explanation of the abbreviations used see the end of the table.

TABLE 3.27

SAMPLING FRAME FOR THE SELECTED PROGRAMS AT THE COMMUNITY COLLEGES AND OVERALL CONTINUED

	MIAMI DADE												COLLEGES				
	DH	RN	EMT	H	SS	OM	B/O	ET	T/I	PS	P	Σ	H	B/O	T/I	P	Σ
1974-75																	
White Male																	
White Female																	
Total Whites	DETAIL NOT AVAILABLE												DETAIL NOT AVAILABLE				
Black Male																	
Black Female																	
Total Blacks																	
Total	22	172	560	754	90	100	190	67	67	64	64	1075	1091	211	67	152	1521
Total Males																	
Total Females																	
1975-76																	
White Male	0	26	493	519	0	25	25	39	39	34	34	617	527	39	57	95	718
White Female	27	153	64	244	68	40	108	0	0	3	3	355	527	140	0	7	674
Total Whites	27	179	557	763	68	65	133	39	39	37	37	972	1054	179	57	102	1392
Black Male	0	1	20	21	0	7	7	8	8	0	0	36	21	7	10	1	39
Black Female	0	24	0	24	21	12	33	0	0	0	0	57	33	38	0	0	71
Total Blacks	0	25	20	45	21	19	40	8	8	0	0	93	54	45	10	1	110
Total	27	204	577	808	89	84	173	47	47	37	37	1065	1108	224	67	103	1502
Total Males	0	27	513	540	0	32	32	47	47	34	34	653	119	46	67	96	757
Total Females	27	177	64	268	89	52	141	0	0	3	3	412	989	178	0	7	745

TABLE 3.27

SAMPLING FRAME FOR THE SELECTED PROGRAMS AT THE COMMUNITY COLLEGES AND OVERALL CONTINUED

	OVERALL					ALL
	H	B/O	T/I	D	P	Σ
1974-75						
White Male						
White Female						
Total Whites		DETAIL NOT AVAILABLE				
Black Male						
Black Female						
Total Blacks						
Total	2054	879	461	597	152	4143
Total Males						
Total Females						
1975-76						
WM	559	65	332	104	95	1185
WF	1053	325	170	302	7	1857
W	1612	390	502	406	102	3012
BM	25	19	48	18	1	111
BF	181	113	17	83	0	394
B	206	132	65	101	1	505
T	1818	522	567	507	103	3517
M	155	84	380	122	96	1266
F	1063	438	187	385	7	2251

ABBREVIATIONS USED IN TABLE 3.27

B/O = business/office programs
DH = dental hygiene
EMT = emergency medical technology
ET = electronic technology
H = health programs
OM = office management
P = public service programs
PS = police science
RN = registered nurse
SS = secretarial science
T/I = trade/industrial programs
Σ = all programs

The sampling frame constructed from the computer listings from the community colleges is given in Table 3.28. The major difference is caused by the omission of 560 completers of emergency medical technology in 1974-75. The row labeled 0 in Table 3.29 is comprised of completers of unknown race and/or sex. Because the information from the Broward and Miami-Dade Community Colleges consisted of an alphabetical listing of all completers in the programs there will be some minor errors of misclassification as the table was computed for this study.

As mentioned above there were few problems with the sampling frame obtained for the vocational centers. The most important was the omission of part time students from North Technical Center. These students are reported by the Palm Beach County School Board rather than the Center itself and the list of such completers was not requested until too late for inclusion in the study.

To select the individuals to be surveyed the following procedure was employed. Sampling was done from each of the individual cells in Tables 3.26 and 3.28. The cells were divided into two groups: those with more than 9 entries and those with no more than 9 entries. All completers were included in the sample from those cells with no more than 9 entries in Tables 3.26 and 3.28. Nine completers were randomly selected from those cells with more than 9 entries.

The result of this procedure was a sample size of 1564 as detailed in Tables 3.29 and 3.30. This represents about 20 percent of the available subjects enumerated in Tables 3.26 and 3.27. Those completers came from programs which accounted for a little over 50 percent of all completers in the selected progams. Thus, the sample of completers accounted for about 10 percent of all completers at the six selected institutions.

TABLE 3.28

ACTUAL SAMPLING FRAME OBTAINED AT THE COMMUNITY COLLEGES[a]

	PALM BEACH									BROWARD									
	DH	RN	H	SS	OM	B/O	PS	P	Σ	RN	H	SS	OM	O	ET	T/I	PS	P	Σ
1974-75																			
W. Male	0	5	5	0	4	4	36	36	45	3	3	0	9	9	2	2	3	3	17
W. Female	38	114	152	11	4	15	7	7	174	42	42	15	2	17	0	0	0	0	59
Tot.White	38	119	157	11	8	19	43	43	219	45	45	15	11	26	2	2	3	3	76
B. Male	0	0	0	0	0	0	0	0	0	0	0	0	1	1	3	3	1	1	5
B. Female	0	2	2	0	0	0	1	1	3	9	9	1	0	0	0	0	0	0	10
Tot.Black	0	2	2	0	0	0	1	1	3	9	9	1	1	1	2	3	1	1	15
Total	38	121	159	11	8	19	44	44	222	54	54	16	12	28	5	5	4	4	91
Tot.Male	0	5	5	0	4	4	36	36	45	3	3	0	10	10	5	5	4	4	22
Tot.Female	38	116	154	11	4	15	8	8	177	51	51	16	2	18	0	0	0	0	69
Other	0	0	0	0	2	2	0	0	0	83	83	5	4	9	3	3	5	5	100
1975-76																			
W. Male	0	1	1	0	3	3	27	27	31	2	2	0	5	5	10	10	8	8	25
W. Female	35	88	123	11	0	11	0	0	134	50	50	22	0	22	0	0	2	2	74
Tot.White	35	89	124	11	3	14	27	27	165	52	52	22	5	27	10	10	10	10	99
B. Male	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	1
B. Female	0	3	3	2	0	2	0	0	5	5	5	0	0	0	0	0	1	1	6
Tot.Black	0	3	3	2	0	2	0	0	5	5	5	0	0	0	1	1	1	1	7
Total	35	92	127	13	3	16	27	27	170	57	57	22	5	27	11	11	11	11	106
Tot.Male	0	1	1	0	3	3	27	27	31	2	2	0	5	5	11	11	8	8	26
Tot.Female	35	90	125	13	0	13	0	0	139	55	55	22	0	22	0	0	3	3	80
Other	0	2	2	0	0	0	0	0	2	82	82	6	5	11	0	0	3	3	96

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[a] For an explanation of the abbreviations used see page 93.

TABLE 3.28

ACTUAL SAMPLING FRAME OBTAINED AT THE COMMUNITY COLLEGES CONTINUED

						MIAMI DADE								ALL COLLEGES			
	DH	RN	EMT	H	SS	OM	B/O	ET	T/I	PS	P	Σ	H	O	T	PS	Σ
1974-75																	
White Male	10	23	0	23	0	8	8	16	16	26	26	73	31	21	18	65	135
White Female	10	160	0	179	53	3	56	0	0	1	1	236	373	88	0	8	469
Total Whites	19	183	0	202	53	11	64	16	16	27	27	309	404	109	18	73	604
Black Male	0	0	0	0	0	2	2	5	5	2	2	9	0	3	8	3	14
Black Female	0	24	0	24	11	0	11	0	0	0	0	35	35	12	0	1	48
Total Blacks	0	24	0	24	11	2	13	5	5	2	2	44	35	15	8	4	62
Total	19	207	0	226	64	13	77	21	21	29	29	353	439	124	26	77	666
Total Males	0	23	0	23	0	10	10	21	21	28	28	82	31	24	26	68	149
Total Females	19	184	0	203	64	3	67	0	0	1	1	271	408	100	0	9	517
Other	2	20	0	22	34	1	35	24	24	6	6	87	105	44	27	11	187
1975-76																	
White Male	0	21	na	na	30	6	6	31	31	30	30	na	na	14	41	65	na
White Female	24	127	na	na	37	3	40	1	1	6	6	na	na	73	1	8	na
Total Whites	24	148	466	638	37	9	46	32	32	36	36	752	814	87	42	73	1016
Black Male	0	1	na	na	20	3	3	5	5	0	0	na	na	3	6	0	na
Black Female	0	21	na	na	21	0	21	0	0	0	0	na	na	23	0	1	na
Total Blacks	0	22	66	88	21	3	24	5	5	0	0	117	96	26	6	1	129
Total	24	170	532	726	58	12	70	37	37	36	36	869	910	113	48	74	1145
Total Males	0	22	na	na	0	9	9	36	36	30	30	na	na	17	47	65	na
Total Females	24	148	na	na	58	3	61	1	1	5	5	na	na	96	1	8	na
Other	3	53	110	166	35	4	39	34	34	7	7	246	194	50	34	10	288

TABLE 3.29

DISTRIBUTION OF SELECTED SAMPLE FROM THE VOCATIONAL CENTERS[a]

	NORTH TECH										
	BK	TW	BM	B/O	PN	H	AC	AM	CY	T/I	Σ
1974-75											
White Male	0	0	2	2	1	1	5	9	2	16	19
White Female	0	8	7	15	9	9	0	0	9	9	33
Total Whites	0	8	9	17	10	10	5	9	11	25	52
Black Male	0	0	0	0	0	0	1	3	1	5	5
Black Female	0	9	3	12	3	3	0	0	6	6	21
Total Blacks	0	9	3	12	3	3	1	3	7	11	26
Total	0	17	12	29	13	13	6	12	18	36	78
Total Males	0	0	2	2	1	1	6	12	3	21	24
Total Females	0	17	10	27	12	12	0	0	15	15	54
1975-76											
White Male	0	0	0	0	0	0	4	9	1	14	14
White Female	9	9	5	23	9	9	0	0	9	9	41
Total Whites	9	9	5	23	9	9	4	9	10	23	55
Black Male	1	0	0	1	2	2	1	3	0	4	7
Black Female	7	2	2	11	8	8	0	1	8	9	28
Total Blacks	8	2	2	12	10	10	1	4	8	13	35
Total	17	11	7	35	19	19	5	13	18	36	90
Total Males	1	0	0	1	2	2	5	12	1	18	21
Total Females	16	11	7	34	17	17	17	0	1	17	69

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[a] For an explanation of the abbreviations used see the end of the table.

TABLE 3.29

DISTRIBUTION OF SELECTED SAMPLE FROM THE VOCATIONAL CENTERS CONTINUED

								SHERIDAN									
	BK	TW	BM	B/O	HO	HP	TT	D	PN	NA	HW	H	AC	AM	CY	T/I	Σ
1974-75																	
White Male	6	2	6	14	9	5	9	23	6	4	0	10	9	9	0	18	65
White Female	9	9	9	27	9	9	9	27	9	9	9	27	0	4	9	13	94
Total Whites	15	11	15	41	18	14	18	50	15	13	9	37	9	13	9	31	159
Black Male	1	1	2	4	1	0	1	2	0	1	0	1	1	7	0	8	15
Black Female	4	8	7	19	4	9	0	13	9	9	9	27	0	0	4	4	63
Total Blacks	5	9	9	23	5	9	1	15	9	10	9	28	1	7	4	12	78
Total	20	20	24	64	23	23	19	65	24	23	18	65	10	20	13	43	237
Total Males	7	3	8	18	10	5	10	25	6	5	0	11	10	16	0	26	80
Total Females	13	17	16	46	13	18	9	40	18	18	18	54	0	4	13	17	157
1975-76																	
White Male	3	0	0	3	8	3	0	11	9	7	0	16	9	9	9	27	57
White Female	9	9	0	18	8	9	0	17	9	9	9	27	0	2	9	11	73
Total Whites	12	9	0	21	16	12	0	28	18	16	9	43	9	11	18	38	130
Black Male	0	0	0	0	3	2	0	5	0	0	0	0	1	9	0	10	15
Black Female	2	7	0	9	4	9	1	14	9	9	9	27	0	0	1	1	51
Total Blacks	2	7	0	9	7	11	1	19	9	9	9	27	1	9	1	11	66
Total	14	16	0	30	23	23	1	47	27	25	18	70	10	20	19	49	196
Total Males	3	0	0	3	11	5	0	16	9	7	0	16	10	18	9	37	72
Total Females	11	16	0	27	12	18	1	31	18	18	18	54	0	2	10	12	124

TABLE 3.29

DISTRIBUTION OF SELECTED SAMPLE FROM THE VOCATIONAL CENTERS
CONTINUED

							LINDSEY									
	BK	TW	BM	B/O	HO	HP	TT	D	PN	NA	HW	H	AC	CY	T/I	Σ
1974-75																
White Male	9	9	8	26	9	9	9	27	2	7	5	14	9	1	10	77
White Female	9	9	9	27	9	9	8	26	9	9	5	23	0	9	9	85
Total Whites	18	18	17	53	18	18	17	53	11	16	10	37	9	10	19	162
Black Male	9	7	9	25	1	3	8	12	2	0	1	3	7	1	8	48
Black Female	9	9	9	27	1	9	8	18	9	9	9	27	0	3	3	75
Total Blacks	18	16	18	52	2	12	16	30	11	9	10	30	7	4	11	123
Total	36	34	35	105	20	30	33	83	22	25	20	67	16	14	30	285
Total Males	18	16	17	51	10	12	17	39	4	7	6	17	16	2	18	125
Total Females	18	18	18	54	10	18	16	44	18	18	14	50	0	12	12	160
1975-76																
White Male	8	7	6	21	9	9	9	27	2	3	5	10	9	6	15	73
White Female	8	9	8	25	9	9	9	27	9	9	9	27	0	9	9	88
Total Whites	16	16	14	46	18	18	18	54	11	12	14	37	9	15	24	161
Black Male	8	2	0	10	4	8	1	13	1	0	1	2	9	1	10	35
Black Female	7	9	7	23	5	8	3	16	9	9	7	25	0	6	6	70
Total Blacks	15	11	7	33	9	16	4	29	10	9	8	27	9	7	16	105
Total	31	27	21	79	27	34	22	83	21	21	22	64	18	22	40	266
Total Males	16	9	6	31	13	17	10	40	3	3	6	12	18	7	25	108
Total Females	15	18	15	48	14	17	12	43	18	18	16	52	0	15	15	158

TABLE 3.29

DISTRIBUTION OF SELECTED SAMPLE FROM THE VOCATIONAL CENTERS

	CENTERS				
	B/O	D	H	T/I	Σ
1974-75					
White Male	42	50	25	44	161
White Female	69	53	59	31	212
Total Whites	111	103	84	75	373
Black Male	29	14	4	21	68
Black Female	58	31	57	13	159
Total Blacks	87	45	61	34	227
Total	198	148	145	109	600
Total Males	71	64	29	65	229
Total Females	127	84	116	44	371
1975-76					
White Male	24	38	26	56	144
White Female	66	44	63	29	202
Total Whites	90	82	89	85	346
Black Male	11	18	4	24	57
Black Female	43	30	60	16	149
Total Blacks	54	48	64	40	206
Total	144	130	153	125	552
Total Males	35	56	30	80	201
Total Females	109	74	123	45	351

TABLE 3.30

DISTRIBUTION OF THE SELECTED SAMPLE FROM THE COMMUNITY COLLEGES AND OVERALL

	PALM BEACH									BROWARD									
	DH	RN	H	SS	OM	B/O	PS	P	Σ	RN	H	SS	OM	B/O	ET	T/I	PS	P	Σ
1974-75																			
W. Male	0	5	5	0	4	4	9	9	18	1	1	0	8	8	2	2	3	3	14
W. Female	9	8	17	9	4	13	7	7	37	9	9	9	2	11	0	0	1	1	21
Tot White	9	13	22	9	8	17	16	16	55	10	10	9	10	19	2	2	4	4	35
B. Male	0	0	0	0	0	0	0	0	0	0	0	0	1	1	2	2	1	1	4
B. Female	0	2	2	0	0	0	1	1	3	9	9	1	0	1	0	0	0	0	10
Tot Black	0	2	2	0	0	0	1	1	3	9	9	1	1	2	2	2	1	1	14
Total	9	15	24	9	8	17	17	17	58	19	19	10	11	21	4	4	5	5	49
Tot Males	0	5	5	0	4	4	9	9	18	1	1	0	9	9	4	4	4	4	18
Tot Female	9	10	19	9	4	13	8	8	40	18	18	10	2	12	0	0	1	1	31
1975-76																			
W. Male	0	1	1	0	3	3	9	9	13	1	1	0	5	5	9	9	8	8	23
W. Female	9	9	18	9	0	9	0	0	27	9	9	9	1	10	0	0	2	2	21
Tot White	9	10	19	9	3	12	9	9	40	10	10	9	6	15	9	9	10	10	44
B. Male	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	1
B. Female	0	3	3	0	0	0	0	0	3	5	5	0	0	0	0	0	1	1	6
Tot Black	0	3	3	0	0	0	0	0	3	5	5	0	0	0	1	1	1	1	7
Total	9	13	22	9	3	12	9	9	43	15	15	9	6	15	10	10	11	11	51
Tot Males	0	1	1	0	3	3	9	9	13	1	1	0	5	5	10	10	8	8	24
Tot Female	9	12	21	9	0	9	0	0	30	14	14	9	1	10	0	0	3	3	27

TABLE 3.30

DISTRIBUTION OF THE SELECTED SAMPLE FROM THE COMMUNITY COLLEGES AND OVERAL CONTINUED

	MIAMI DADE												COLLEGES				
	DH	RN	EMT	H	SS	OM	B/O	ET	T/I	PS	P	Σ	H	B/O	T/I	P	Σ
1974-75																	
White Male	0	8	0	8	0	8	8	9	9	9	9	34	14	20	11	21	66
White Female	9	7	0	16	9	3	12	0	0	1	1	29	42	36	0	9	87
Total Whites	9	15	0	24	9	11	20	9	9	10	10	63	56	56	11	30	153
Blk. Male	0	0	0	0	0	2	2	5	5	2	2	9	0	3	7	3	13
Blk. Female	0	9	0	9	9	0	9	0	0	0	0	18	20	10	0	1	31
Total Blacks	0	9	0	9	9	2	11	5	5	2	2	27	20	13	7	4	44
Total	9	24	0	33	18	13	31	14	14	12	12	90	76	69	18	34	197
Tot. Male	0	8	0	8	0	10	10	14	14	11	11	43	14	23	18	24	79
Tot. Female	9	16	0	25	18	3	21	0	0	1	1	47	62	46	0	10	127
1975-76																	
White Male	0	9	9	18	0	6	6	9	9	9	9	42	20	14	18	26	78
White Female	9	9	9	27	9	3	12	0	0	6	6	45	54	31	0	8	93
Total Whites	9	18	18	45	9	9	18	0	0	15	15	87	74	56	18	34	171
Blk. Male	0	1	9	10	0	3	3	4	4	0	0	17	10	3	5	0	18
Blk. Female	0	9	0	9	9	0	9	0	0	0	0	18	17	9	0	1	27
Total Blacks	0	10	9	19	9	3	12	4	4	0	0	35	27	12	5	1	45
Total	9	28	27	64	18	12	30	13	13	15	15	122	101	57	23	35	216
Tot. Male	0	10	18	28	0	9	9	13	13	9	9	59	30	17	23	26	96
Tot. Female	9	18	9	36	18	3	21	0	0	6	6	63	71	40	0	9	120

TABLE 3.30

DISTRIBUTION OF THE SELECTED SAMPLE FROM THE COMMUNITY COLLEGES AND OVERALL CONTINUED

	OVERALL					ALL
	H	B/O	T/I	D	P	Σ
1974-75						
White Male	39	62	55	50	21	227
White Female	101	105	31	53	9	299
Total Whites	140	167	86	103	30	526
Black Male	4	32	28	14	3	81
Black Female	77	68	13	31	1	190
Total Black	81	100	41	45	4	271
Total	231	267	127	148	34	796
Total Male	43	94	83	64	24	308
Total Female	78	173	44	84	10	488
1975-76						
White Male	46	38	74	38	26	222
White Female	117	97	29	44	8	295
Total Whites	163	135	103	82	34	517
Black Male	14	14	29	18	0	75
Black Female	77	52	16	30	1	176
Total Black	91	66	45	48	1	251
Total	254	201	148	130	35	768
Total Male	60	52	103	56	26	297
Total Female	194	149	45	74	9	271

They accounted for about 8 percent of the total number of completers in the three county region as a whole.

The sample size chosen was relatively large but this was deliberate for two reasons. First, conversations with school officials warned the researchers that many of those sampled would be difficult to locate. Experience from the placement and follow up studies conducted by the institution indicated that many students changed address on completion of their training and were very difficult to locate. In a mail survey, the number of undeliverable questionnaires due to change of address could be expected to be high. Second, experience from the same source indicated that the target population did not readily return questionnaires. Response rates on the placement and follow-up surveys typically fell in the 20-35 percent range. Thus, a relatively large sample was selected to ensure an adequate number of responses.

3.6 THE SAMPLE INSTRUMENT

A questionnaire was constructed to gather information on the sample of completers to permit measurement of the impact of post secondary vocational and technical programs on class and income inequality. The survey instrument was pretested twice on a sample of completers of post secondary vocational and technical programs from Atlantic Vocational Center. Information was sought on five topics. (See Appendix A).

The first set of questions requested basic sociodemographic information such as the respondent's race, sex, age and marital status. These permitted the stratified sample to be blown up to the population totals, and enabled the researchers to allow for such phenomena as race, sex and age discrimination.

A second group of questions were designed to measure the respondent's socioeconomic background. A distinction was drawn between those who attended the post secondary programs within a year or two of leaving high school, and those who took the programs several years after the completion of their high school studies. Within this latter group, single persons were distinguished from those who were married. These distinctions were made because it appeared likely that the relevant socioeconomic background variable for those in the first group (attended very soon after high school) would be the status of their parents, whereas the background of those in the second group would be some combination of their preprogram socioeconomic status and the status of their spouse if they were married.

A third group of questions collected information on the post secondary educational history of program completers. It was necessary to include this information because the theory suggests that personal earnings are the return on human capital, and each individual's human capital would include the totality of his or her post secondary educational experience. Other types of human capital should, in principle, be included, particularly on the job training. Information on this was not gathered because of the difficulty of measurement and because it was not expected that such training would be significant for a population of completers of an educational program within the last three years. The information gathered on the post secondary educational history included the type of program, its length in months, the number of class contact hours per week and the year completed.

The respondent's labor force history since entering the vocational program was the focus of the fourth group of questions. These included labor force status, occupation, type of employer, income, job history since entering the program and the relationship of each job to the various post secondary education programs attended.

The last subject area from which questions were included involved the effectiveness of the programs in achieving the goals which motivated the respondent's decisions to participate in them. The respondent was asked to enumerate and rank his or her goals, the degree to which they were met since taking the program, and whether there was room for improvement in the design of the program.

CHAPTER 4

A SURVEY OF POST SECONDARY VOCATIONAL AND TECHNICAL COMPLETERS: RESPONSE TO THE SAMPLE

The questionnaire was mailed to the sample of respondents in June, 1977. Response after two weeks was extremely disappointing (about 14 percent), so it was decided to repeat the mailing. Prior to a second mailing, all members of the sample for whom telephone numbers could be obtained were contacted for address verification.[1] As a result, a considerable improvement resulted from the second mailing. After two more weeks, the respondents with telephones were called again and a number of telephone interviews were executed. The remaining respondents received a third mailing.

This chapter of the report contains four sections. The first analyzes the undeliverable rate by program, race and ethnic background. A second section analyzes the return rate. The procedure used to adjust for oversampling small cells is illustrated in a third section, and the chapter concludes with a detailed profile of post secondary vocational and technical completers in Southeast Florida.

4.1 AN ANALYSIS OF UNCOLLECTIBLE RESPONSES

By early September a total of 642 unduplicated usable responses had been received. In addition, 364 questionnaires were returned as undeliverable (23.26 percent). An attempt to secure new addresses for respondents had been made during the telephone follow ups mentioned above. Thus the undeliverables consisted of those respondents for whom no forwarding addresses were supplied by the post office, and for whom no forwarding addresses were available from the current occupant of the original address. It is possible that some of these respondents could be tracked down with greater effort, but this would have taken considerably greater resources and time than were available. Prior to selecting the sample, officials at the vocational institutions who were familiar with their placement and follow up results had indicated the difficulty of contacting completers because of address changes. Recognizing the limited ability of this study to deal with this problem, the sample size was expanded to allow for non response due to undelivered questionnaires. This does not avoid any non response bias due to undelivered questionnaires, but it does ensure an adequate number of observations to ensure statistical inference.

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[1] Telephone numbers were obtained from the regular phone directories and from cross classified directories.

It is the judgment of these researchers that the non response bias introduced by the undelivered questionnaires is probably not very significant. The addresses obtained from the vocational institutions were those supplied by the students when they were enrolled in the programs. The fact that a substantial number changed addresses since completing the programs is consistent with almost any of the labor force experiences of those who remained. That is, there is no reason to believe that the rate of employment, or departure from the labor force (to have a baby, for example) would be any different among those who changed addresses than among those who could be contacted.

The distribution of delivered questionnaires (those mailed minus those undelivered) is given in Table 4.1. A summary by year, program area, race and sex is given in Table 4.2. The percentage of questionnaires that were undelivered from the health, business/office, and trade/industrial program areas was between 20 and 25 percent. The proportion undelivered from the public service area was less than 10 percent but one out of three questionnaires to completers of the distributive area was undelivered.

TABLE 4.1

DISTRIBUTION OF DELIVERED QUESTIONNAIRES BY INSTITUTION [a]

	NORTH TECH										
	BK	TW	BM	B/O	PN	H	AC	AM	CY	T/I	Σ
1974-75											
White Male	0	0	2	2	1	1	5	6	2	13	16
White Female	0	8	7	15	9	9	0	0	8	8	32
Total White	0	8	9	17	10	10	5	6	10	21	48
Black Male	0	0	0	0	0	0	1	3	1	5	5
Black Female	0	9	1	10	2	2	0	0	5	5	17
Total Black	0	9	1	10	2	2	1	3	6	10	22
Total	0	17	10	27	12	12	6	9	16	31	70
Total Males	0	0	2	2	1	1	6	9	3	18	21
Total Females	0	17	8	25	11	11	0	0	13	13	49
1975-76											
White Male	0	0	0	0	0	0	4	9	1	14	14
White Female	8	8	4	20	9	9	0	0	9	9	38
Total White	8	8	4	20	9	9	4	9	10	23	52
Black Male	1	0	0	1	1	1	1	2	0	3	5
Black Female	5	2	2	9	5	5	0	1	8	9	23
Total Black	6	2	2	10	6	6	1	3	8	12	28
Total	14	10	6	30	15	15	5	12	18	35	80
Total Males	1	0	0	1	1	1	5	11	1	17	19
Total Females	13	10	6	29	14	14	0	1	17	18	61

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[a] For explanation of abbreviations used in this table see pages 89 and 93.

TABLE 4.1

DISTRIBUTION OF DELIVERED QUESTIONNAIRES BY INSTITUTION (CONTINUED)

	SHERIDAN																
	BK	TW	BM	B/O	HO	HP	TT	D	PN	NA	HW	H	AC	AM	CY	T/I	Σ
1974-75																	
White Male	6	1	6	13	8	3	7	18	5	3	0	8	8	4	0	12	51
White Female	7	7	9	23	7	7	7	21	5	8	8	21	0	4	7	11	76
Total White	13	8	15	36	15	10	14	39	10	11	8	29	8	8	7	23	127
Black Male	0	0	1	1	1	0	1	2	0	1	0	1	1	5	0	6	10
Black Female	4	6	6	16	3	7	0	10	4	5	5	14	0	0	4	4	44
Total Black	4	6	7	17	4	7	1	12	4	6	5	15	1	5	4	10	54
Total	17	14	22	53	19	17	15	51	14	17	13	44	9	13	11	33	181
Total Males	6	1	7	14	9	3	8	20	5	4	0	9	9	9	0	18	61
Total Females	11	13	15	39	10	14	7	31	9	13	13	35	0	4	11	15	120
1975-76																	
White Male	3	0	0	3	5	2	0	7	6	7	0	13	9	7	6	22	45
White Female	9	9	0	18	7	8	0	15	8	7	6	21	0	2	8	10	64
Total White	12	9	0	21	12	10	0	22	14	14	6	34	9	9	14	32	109
Black Male	0	0	0	0	3	1	0	4	0	0	0	0	0	7	0	7	11
Black Female	2	5	0	7	4	8	0	12	7	9	8	24	0	0	1	8	44
Total Black	2	5	0	7	7	9	0	16	7	9	8	24	0	7	1	8	55
Total	14	14	0	28	19	19	0	38	21	13	14	58	9	16	15	40	164
Total Males	3	0	0	3	8	3	0	11	6	7	0	13	9	14	6	29	56
Total Females	11	14	0	25	11	16	0	27	15	16	14	45	0	2	9	11	108

TABLE 4.1

DISTRIBUTION OF DELIVERED QUESTIONNAIRES BY INSTITUTION (CONTINUED)

							LINDSEY									
	BK	TW	BM	B/O	HO	HP	TT	D	PN	NA	HW	H	AC	CY	T/I	Σ
1974-75																
White Male	7	7	7	21	3	7	4	14	2	4	2	8	6	1	7	50
White Female	4	6	7	17	5	4	5	14	5	4	2	11	0	6	6	48
Total White	11	13	14	38	8	11	9	28	7	8	4	19	6	7	13	98
Black Male	7	3	8	18	1	3	5	9	2	0	1	3	3	1	4	34
Black Female	6	6	4	16	0	5	3	8	6	8	6	20	0	2	2	46
Total Black	13	9	12	34	1	8	8	17	8	8	7	7	3	3	6	80
Total	24	22	26	72	9	19	17	45	15	16	11	42	9	10	19	178
Total Males	14	10	15	39	4	10	9	23	4	4	3	11	9	2	11	84
Total Females	10	12	11	33	5	9	8	22	11	12	8	31	0	8	8	94
1975-76																
White Male	5	6	5	16	7	6	7	20	0	2	3	5	8	1	9	50
White Female	4	4	8	16	4	5	9	18	6	8	9	23	0	5	5	62
Total White	9	10	13	32	11	11	16	38	6	10	12	28	8	6	14	112
Black Male	5	1	0	6	2	4	1	7	0	0	1	1	7	0	7	21
Black Female	6	6	3	15	3	4	2	9	8	7	4	19	0	4	4	47
Total Black	11	7	3	21	5	8	3	16	8	7	5	20	7	4	11	68
Total	20	17	16	53	16	19	19	54	14	17	17	48	15	10	25	180
Total Males	10	7	5	22	9	10	8	27	0	2	4	6	15	1	16	71
Total Females	10	10	11	31	7	9	11	27	14	15	13	42	0	9	9	109

TABLE 4.1

DISTRIBUTION OF DELIVERED QUESTIONNAIRES BY INSTITUTION (CONTINUED)

ALL CENTERS	B/O	D	H	T/I	Σ
1974-75					
White Male	36	32	17	32	117
White Female	55	35	41	25	156
Total White	91	67	58	57	273
Black Male	19	11	4	15	49
Black Female	42	18	36	11	107
Total Black	61	29	40	26	156
Total	152	96	98	83	429
Total Males	55	43	21	47	166
Total Females	97	52	77	36	262
1975-76					
White Male	19	27	18	45	109
White Female	54	33	53	24	164
Total White	73	60	71	69	273
Black Male	7	11	2	17	37
Black Female	31	21	48	14	114
Total Black	38	32	50	31	151
Total	111	92	121	100	424
Total Males	26	38	20	62	146
Total Females	85	54	101	38	278

TABLE 4.1

DISTRIBUTION OF DELIVERED QUESTIONNAIRES BY INSTITUTION (CONTINUED)

	PALM BEACH									BROWARD									
	DH	RN	H	SS	OM	B/O	PS	P	Σ	RN	H	SS	OM	B/O	ET	T/I	PS	P	Σ
1974-75																			
W. Male	0	3	3	0	4	4	8	8	15	1	1	0	8	8	2	2	3	3	14
W.Female	6	8	14	9	3	12	6	6	32	8	8	8	2	10	0	0	1	1	19
T. White	6	11	17	9	7	16	14	14	47	9	9	8	10	18	2	2	4	4	33
B. Male	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	3
B.Female	0	2	2	0	0	0	1	1	3	5	5	1	0	1	0	0	0	0	6
T.Black	0	2	2	0	0	0	1	1	3	5	5	1	1	2	1	1	1	1	9
Total	6	13	19	9	7	16	15	15	50	14	14	9	11	20	3	3	5	5	42
T. Males	0	3	3	0	4	4	8	8	15	1	1	0	9	9	3	3	4	4	17
T.Females	6	10	16	9	3	12	7	7	35	13	13	9	2	11	0	0	1	1	25
1975-76																			
W. Male	0	1	1	0	3	3	9	9	13	0	0	0	5	5	8	8	8	8	21
W.Female	7	8	15	9	0	9	0	0	24	6	6	8	1	9	0	0	2	2	17
T.White	7	9	16	9	3	12	9	9	37	6	6	8	6	14	8	8	10	10	38
B. Male	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	1
B.Female	0	3	3	0	0	0	0	0	3	3	3	0	0	0	0	0	1	1	4
T.Black	0	3	3	0	0	0	0	0	3	3	3	0	0	0	1	1	1	1	5
Total	7	12	19	9	3	12	9	9	40	9	9	8	6	14	9	9	11	11	43
T. Males	0	1	1	0	3	3	9	9	13	0	0	0	5	5	9	9	8	8	22
T.Females	7	11	18	9	0	9	0	0	27	9	9	8	1	9	0	0	3	3	21

TABLE 4.1

DISTRIBUTION OF DELIVERED QUESTIONNAIRES BY INSTITUTION (CONTINUED)

	MIAMI DADE												ALL COLLEGES				
	DH	RN	EMT	H	SS	OM	B/O	ET	T/I	PS	P	Σ	H	B/O	T/I	P	Σ
1974-75																	
White Male	0	5	0	5	0	4	4	8	8	9	9	26	9	16	10	20	55
White Female	8	6	0	14	8	2	10	0	0	1	1	25	36	32	0	8	76
Total White	8	11	0	19	8	6	14	8	8	10	10	51	45	48	10	28	131
Black Male	0	0	0	0	0	2	2	3	3	2	2	7	0	3	4	3	10
Black Female	0	9	0	9	8	0	8	0	0	0	0	17	16	9	0	1	26
Total Black	0	9	0	9	8	2	10	3	3	2	2	24	16	12	4	4	36
Total	8	20	0	28	16	8	24	11	11	12	12	75	61	60	14	32	167
Total Males	0	5	0	5	0	6	6	11	11	11	11	33	9	19	14	23	65
Total Females	8	15	0	23	16	2	18	0	0	1	1	42	52	41	0	9	102
1975-76																	
White Male	0	8	7	15	0	5	5	8	8	9	8	36	16	13	16	25	70
White Female	6	8	6	20	6	1	7	0	0	5	5	32	41	25	0	7	73
Total White	6	16	13	35	6	6	12	9	8	14	13	68	57	38	16	32	143
Black Male	0	1	8	9	0	3	3	4	4	0	0	16	9	3	5	0	17
Black Female	0	7	0	7	9	0	9	0	0	0	0	16	13	9	0	1	23
Total Black	0	8	8	16	9	3	12	4	4	0	0	32	22	12	5	1	40
Total	6	24	21	51	15	9	24	12	12	14	13	100	79	50	21	33	183
Total Males	0	9	15	24	0	8	8	12	12	9	8	52	25	16	21	25	87
Total Females	6	15	6	27	15	1	16	0	0	5	5	48	54	34	0	8	96

TABLE 4.2

DISTRIBUTION OF DELIVERED QUESTIONNAIRES BY YEAR AND PROGRAM AREA[a]

	ALL INSTITUTIONS					
	H	B/O	T/I	D	P	Σ
1974-75						
White Male	26	52	42	32	20	172
White Female	77	87	25	35	8	232
Total White	103	139	67	67	28	404
Black Male	4	22	19	11	3	59
Black Female	52	51	11	18	1	133
Total Black	56	73	30	29	4	192
Total	159	212	97	96	32	596
Total Males	30	74	61	43	23	231
Total Females	129	138	36	53	9	365
1975-76						
White Male	34	32	61	27	25	179
White Female	94	79	24	33	7	237
Total White	128	111	85	60	32	416
Black Male	11	10	22	11	0	54
Black Female	61	40	14	21	1	137
Total Black	72	50	36	32	1	191
Total	200	161	121	92	33	607
Total Males	45	42	83	38	25	233
Total Females	155	119	38	54	8	374
Both Years						
White Male	60	84	103	59	45	351
White Female	171	166	49	68	15	469
Total White	231	250	152	127	60	820
Black Male	15	32	41	22	3	113
Black Female	113	91	25	39	2	270
Total Black	128	123	66	61	5	383
Total	359	373	218	188	65	1203
Total Males	75	116	144	81	48	464
Total Females	284	257	74	107	17	739

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[a] For an explanation of the abbreviations used in this table see pages 89 and 93.

The distribution of mailed questionnaires in the distributive area by year, program area, race and sex is given in Table 4.3. The corresponding breakdown of the delivered questionnaires is given in Table 4.4. Comparing these two tables it can be seen that the relatively low delivery rate for the distributive area reflects a low delivery rate in all three of the included programs (hotel office, hotel PBX and travel ticketing). By year, the only remarkable finding is that hotel PBX shows no increase in delivery rate during 1976. The increase in travel ticketing is substantial and suggests that the low delivery rate for this program occurred in one year (1975). Differences in delivery rates by race and sex were remarkable.

Only two of the institutions offered the programs in the distributive area, namely, Lindsey Hopkins and Sheridan. The distribution of mailed and delivered questionnaires by years, race and sex for each of the institutions is given in Table 4.5. From this it is clear that the major short fall in delivered questionnaires occurred for Lindsey Hopkins completers where less than 60 percent were delivered. This is not surprising since Lindsey Hopkins has very well known and elaborate programs in the hotel areas,[2] and thus a relatively large number of out of town students may enroll in these programs. It is likely that many students may come from the West Indies for training at Lindsey Hopkins.

The distribution of delivered questionnaires for the distributive programs at Lindsey is given as part of Table 4.1. This can be compared with the distribution of those mailed given as part of Table 3.29 in the preceding section of this report. The only point of interest from a comparison of those tables is that the short fall of delivered questionnaires in the travel ticketing area occurred in 1975. The reason for

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[2] The students operate their own hotel as part of their training.

TABLE 4.3

DISTRIBUTION OF MAILED QUESTIONNAIRES IN THE DISTRIBUTIVE AREA BY YEAR, PROGRAM, RACE AND SEX[a]

	ALL INSTITUTIONS			
	HO	HP	TT	D
1974-75				
White Male	18	14	18	50
White Female	18	18	17	53
Total White	36	32	35	103
Black Male	2	3	9	14
Black Female	5	18	8	31
Total Black	7	21	17	45
Total	43	53	52	148
Total Males	20	17	27	64
Total Females	23	36	25	84
1975-76				
White Male	17	12	9	38
White Female	17	18	9	44
Black Male	34	30	18	82
Black Female	7	10	1	18
Total Black	9	17	4	30
Total	16	27	5	48
Total Males	50	57	23	130
Total Females	24	22	10	56
	26	35	13	74
Both Years				
White Male	35	26	27	88
White Female	35	36	26	97
Black Male	70	62	53	185
Black Female	9	13	10	32
Total Black	14	35	12	61
Total	23	48	22	93
Total Males	93	110	75	278
Total Females	44	39	37	120
	49	71	38	158

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[a] For an explanation of the abbreviations used in this table see pages 89 and 93.

TABLE 4.4

DISTRIBUTION OF DELIVERED QUESTIONNAIRES IN THE DISTRIBUTIVE AREA BY YEAR, PROGRAM, RACE AND SEX[a]

	ALL INSTITUTIONS			
	HO	HP	TT	D
1974-75				
White Male	11	10	11	32
White Female	11	11	12	34
Total White	22	21	23	66
Black Male	2	3	6	11
Black Female	3	12	3	18
Total Black	5	15	9	29
Total	27	36	32	95
Total Males	13	13	17	43
Total Females	14	23	15	52
1975-76				
White Male	12	8	7	27
White Female	11	13	9	33
Total White	23	21	16	60
Black Male	5	5	1	11
Black Female	7	12	2	21
Total Black	12	17	3	32
Total	35	38	19	92
Total Males	17	13	8	38
Total Females	18	25	11	54
Both Years				
White Male	23	18	18	59
White Female	22	24	21	67
Total White	45	42	39	126
Black Male	7	8	7	22
Black Female	10	24	5	39
Total Black	17	32	12	61
Total	62	74	51	187
Total Males	30	26	25	81
Total Females	32	48	26	106

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[a] For an explanation of the abbreviations used in this table see pages 89 and 93.

TABLE 4.5

DISTRIBUTION OF MAILED AND DELIVERED QUESTIONNAIRES FOR LINDSEY (DL) AND SHERIDAN (DS) BY YEAR, RACE AND SEX

	MAILED		DELIVERED	
	DL	DS	DL	DS
1974-75				
White Male	27	23	14	18
White Female	26	27	13	21
Total White	53	50	27	39
Black Male	12	2	9	2
Black Female	18	13	8	10
Total Black	30	15	17	12
Total	83	65	44	51
Total Males	39	25	23	20
Total Females	44	40	21	31
1975-76				
White Male	27	11	20	7
White Female	27	17	18	15
Total White	54	28	38	22
Black Male	13	5	7	4
Black Female	16	14	9	12
Total Black	29	19	16	16
Total	83	47	54	38
Total Males	40	16	27	11
Total Females	43	31	27	27
Both Years				
White Male	54	34	34	25
White Female	53	44	31	36
Total White	107	78	65	61
Black Male	25	7	16	6
Black Female	34	27	17	22
Total Black	59	34	33	28
Total	166	112	98	89
Total Males	79	41	50	31
Total Females	77	71	48	58

this is not clear, but it can be noted that the percentage of those sampled who were black was much higher in 1975. This could reflect Carribean students also. Incidentally, the low delivery rate for hotel PBX students in 1976 referred to earlier also emerges from Lindsey Hopkins. Again, the percent black rose for this program in 1976.

To return to the main analysis of the percent delivered, the distribution of delivery rates by race and sex as implied by Table 4.1 may be analyzed. By sex, the percentage of questionnaires that were undelivered showed virtually no variation between males (23.31 percent) and females (23.23 percent). The difference between the percentage of undelivered questionnaires males to whites (21.5) and blacks (26.82) was more substantial, but the blacks were oversampled for the study so the resulting bias is probably not significant.

4.2 AN ANALYSIS OF RESPONSE RATES

The number of mailed questionnaires that were returned was 642. This represented a response rate of 41 percent, which was about the same as that achieved by Harris (1972). This compares to a response rate of 33 percent achieved by Hu _et al_. (1969). A response rate of over 40 percent is respectable for a mail survey which does not go to an elite group (Selltiz _et al_. 1976, pp. 296-7).

At the time the sample size was selected, it was assumed that the crude overall response rate that could be achieved would be 40 percent (and this was what was achieved) and it was decided to attempt to secure at least a 50 percent response rate from the delivered questionnaires. As noted above 642 were returned and 1201 were delivered. This represented a response rate of 53.46 percent. Thus, a majority of those contacted returned the questionnaires.

By program area, over 50 percent was received from each area except the distributive programs (48.12 percent) which was very close to 50 percent (Tables 4.6 and 4.7). The distribution of returns for the programs of the distributive area by year, race and sex is given in Table 4.8.

From this table the source of low returns can be isolated as follows. The return rate (as percent of delivered) was low (about one third) for blacks in the hotel office and travel ticketing programs. While there is no way of checking short of a fourth mailing, it is likely that this return rate depends on new occupants of old addresses sending back the questionnaires, and it may be that these new occupants failed to do so. It is also important to note that several students enrolled in the hotel programs were employed and living in hotels during the programs. They may have moved since then. The response among whites in the hotel PBX area was also poor.

The percentage returned from the business/office area was barely over 50 percent (50.94 percent). This is consistent with the findings in the literature that females respond to questionnaires more readily than males, and that people from higher socioeconomic backgrounds are also more likely to respond Completers from the health area tend to be female, and the proportion from the community colleges is greater. The vocational centers are less expensive than the colleges.

By sex and race, the percentages returned followed the standard pattern encountered in the survey literature where females respond more than males (43.13 versus 37.7 percent) and whites respond more than blacks (44.87 versus 33.33). Because the population totals by sex and race were available, the bias introduced by these differential response rates was greatly reduced.

TABLE 4.6

DISTRIBUTION OF RETURNED QUESTIONNAIRES BY INSTITUTION[a]

	NORTH TECH										
	BK	TW	BM	B/O	PN	H	AC	AM	CY	T/I	Σ
1974-75											
White Male	*	*	2	2	0	0	0	5	2	7	9
White Female	*	6	4	10	4	4	*	*	5	5	19
Total White	*	6	6	12	4	4	0	5	7	12	28
Black Male	*	*	*	*	*	*	1	1	1	3	3
Black Female	*	5	1	6	2	2	*	*	2	2	10
Total Black	*	5	1	6	2	2	1	1	3	5	13
Total	*	10	7	17	6	6	1	6	10	17	40
Total Males	*	*	2	2	0	0	1	6	3	10	12
Total Females	*	10	5	15	6	6	*	*	7	7	28
1975-76											
White Male	*	*	*	*	*	*	1	5	1	7	7
White Female	5	7	2	14	4	4	*	*	5	5	23
Total White	5	7	2	14	4	4	1	5	6	12	30
Black Male	0	*	*	0	0	0	0	2	*	2	2
Black Female	4	0	2	6	3	3	*	*	3	3	12
Total Black	4	0	2	6	3	3	0	2	3	5	14
Total	9	7	3	19	7	7	1	7	9	17	43
Total Males	0	*	*	0	0	0	1	7	1	9	9
Total Females	9	7	4	20	7	7	0	*	8	8	35

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[a] For an explanation of the abbreviations used in this table see pages 89 and 93.

*No questionnaires were mailed or delivered to individuals with the characteristics of this cell.

TABLE 4.6

DISTRIBUTION OF RETURNED QUESTIONNAIRES BY INSTITUTION (CONTINUED)

								SHERIDAN									
	BK	TW	BM	B/O	HO	HP	TT	D	PN	NA	HW	H	AC	AM	CY	T/I	Σ
1974-75																	
White Male	3	1	4	8	4	0	6	10	2	2	*	4	5	3	*	8	30
White Female	5	6	3	14	7	2	6	15	4	6	5	15	*	1	3	4	48
Total White	8	7	7	22	11	2	12	25	6	8	5	19	5	4	3	12	78
Black Male	*	*	1	1	0	*	1	1	*	1	*	1	0	4	*	4	7
Black Female	1	3	5	9	1	1	*	2	1	3	2	6	*	*	2	2	19
Total Black	1	3	6	10	1	1	1	3	1	4	2	7	0	4	2	6	26
Total	9	10	13	32	12	3	13	28	7	12	7	26	5	8	5	18	104
Total Males	3	1	5	9	4	0	7	11	2	3	*	5	5	7	*	15	37
Total Females	6	9	8	23	8	3	6	17	5	9	7	21	*	1	5	6	67
1975-76																	
White Male	2	1	*	3	1	2	*	3	4	6	*	10	6	3	3	12	28
White Female	6	4	*	10	5	7	*	12	7	4	3	14	*	2	7	9	45
Total White	8	5	*	13	6	9	*	15	11	10	3	24	6	5	10	21	73
Black Male	*	*	*	*	1	0	*	1	*	*	*	*	*	2	*	2	3
Black Female	2	3	*	5	2	3	*	5	3	7	5	15	*	*	0	0	25
Total Black	2	3	*	5	3	3	*	6	3	7	5	15	*	2	0	2	28
Total	10	8	*	18	9	12	*	21	14	17	8	39	6	7	10	23	101
Total Males	2	1	*	3	2	2	*	4	4	6	*	10	6	5	3	14	31
Total Females	8	7	*	15	7	10	*	17	10	11	8	29	*	2	7	9	70

TABLE 4.6

DISTRIBUTION OF RETURNED QUESTIONNAIRES BY INSTITUTION
(CONTINUED)

	LINDSEY															
	BK	TW	BM	B/O	HO	HP	TT	D	PN	NA	HW	H	AC	CY	T/I	Σ
1974-75																
White Male	2	3	1	6	2	2	2	6	1	1	0	2	3	1	4	18
White Female	1	2	1	4	1	2	3	6	4	3	3	10	*	2	2	22
Total White	3	5	2	10	3	4	5	12	5	4	3	12	3	3	6	40
Black Male	5	1	4	10	0	2	2	4	2	0	1	3	1	0	1	18
Black Female	2	3	1	6	0	4	0	4	2	2	3	7	*	1	1	18
Total Black	7	4	5	16	0	6	2	8	4	2	4	10	1	1	2	36
Total	10	9	7	26	3	10	7	20	9	6	7	22	4	4	8	76
Total Males	7	4	5	16	2	4	4	10	3	1	1	5	4	1	5	36
Total Females	3	5	2	10	1	6	3	10	6	5	6	17	*	3	3	40
1975-76																
White Male	0	3	2	5	3	1	2	6	0	1	1	2	6	1	7	20
White Female	2	1	4	7	2	1	4	7	2	6	7	16	*	3	3	32
Total White	2	4	6	12	5	2	6	13	2	7	8	17	6	4	10	52
Black Male	2	0	*	2	0	5	0	5	0	0	0	0	3	*	3	10
Black Female	0	3	1	4	1	1	1	3	2	3	1	6	*	1	1	14
Total Black	2	3	1	6	1	6	1	8	2	3	1	6	3	1	4	24
Total	4	7	7	18	6	8	7	21	4	10	9	23	9	5	14	76
Total Male	2	3	2	7	3	6	2	11	0	1	1	2	9	1	10	30
Total Female	2	4	5	11	3	2	5	10	4	9	8	21	*	4	4	46

TABLE 4.6

DISTRIBUTION OF RETURNED QUESTIONNAIRES BY INSTITUTION (CONTINUED)

	ALL CENTERS				
	B/O	D	H	T/I	Σ
1974-75					
White Male	16	16	6	19	57
White Female	29	21	29	12	91
Total White	45	37	35	31	148
Black Male	11	5	4	8	28
Black Female	19	6	15	4	44
Total Black	30	11	19	12	72
Total	75	48	54	43	220
Total Males	27	21	10	27	85
Total Females	38	27	44	16	35
1975-76					
White Male	8	9	12	26	55
White Female	31	19	33	17	100
Total White	39	28	45	43	155
Black Male	2	6	0	7	15
Black Female	14	8	24	4	50
Total Black	16	14	24	11	65
Total	55	42	69	54	220
Total Males	10	15	12	33	70
Total Females	45	27	57	21	150

TABLE 4.6

DISTRIBUTION OF RETURNED QUESTIONNAIRES BY INSTITUTION (CONTINUED)

	PALM BEACH									BROWARD									
	DH	RN	H	SS	OM	B/O	PS	P	Σ	RN	H	SS	OM	B/O	ET	T/I	PS	P	Σ
1974-75																			
W. Male	*	2	2	*	4	4	6	6	12	1	1	*	2	2	1	1	1	1	5
W.Female	6	9	15	5	3	8	5	5	28	8	8	7	1	8	*	*	*	*	16
T.White	6	11	17	5	7	12	11	11	40	9	9	7	3	10	1	1	1	1	21
B. Male	*	*	*	*	*	*	*	*	*	*	*	*	0	0	1	1	1	1	2
B.Female	*	1	1	*	*	*	1	1	2	0	0	0	*	0	*	*	*	*	0
T.Black	*	1	1	*	*	*	1	1	2	0	0	0	0	0	1	1	1	1	2
Total	6	12	18	5	7	12	12	12	42	9	9	7	3	10	2	2	2	2	23
T. Male	*	2	2	*	4	4	6	6	12	1	1	*	2	2	2	2	2	2	7
T.Female	6	10	16	5	3	8	6	6	30	8	8	7	1	8	*	*	*	*	16
1975-76																			
W. Male	*	0	0	*	1	1	6	6	7	*	*	*	2	2	6	6	4	4	12
W.Female	6	5	11	7	*	7	*	*	18	5	5	2	*	2	*	*	2	2	9
T.White	6	5	11	7	1	8	6	6	25	5	5	2	2	4	6	6	6	6	21
B. Male	*	*	*	*	*	*	*	*	*	*	*	*	*	*	0	0	*	*	0
B.Female	*	3	3	*	*	*	*	*	[illegible]	1	1	*	*	*	*	*	1	1	2
T.Black	*	3	3	*	*	*	*	*	3	1	1	*	*	*	0	0	1	1	2
Total	6	8	14	7	1	8	6	6	28	6	6	2	2	4	6	6	7	7	23
T. Male	*	0	0	*	1	1	6	6	7	*	*	*	2	2	6	6	4	4	12
T.Female	6	8	14	7	*	7	*	*	21	6	6	2	*	2	*	*	3	3	11

TABLE 4.6

DISTRIBUTION OF RETURNED QUESTIONNAIRES BY INSTITUTION
(CONTINUED)

	MIAMI DADE												ALL COLLEGES				
	DH	RN	EMT	H	SS	OM	B/O	ET	T/I	PS	P	Σ	H	O	T/I	P	Σ
1974-75																	
White Male	*	0	*	0	*	3	3	7	7	2	2	12	3	9	8	9	29
White Female	6	4	*	10	3	2	5	*	*	1	1	16	33	21	*	6	60
Total White	6	4	*	10	3	5	8	7	7	3	3	28	36	30	8	15	89
Black Male	*	*	*	*	*	1	1	2	2	0	0	3	*	1	3	1	5
Black Female	*	7	*	7	4	*	4	*	*	*	*	11	8	4	*	1	13
Total Black	*	7	*	7	4	1	5	2	2	0	0	14	8	5	3	2	18
Total	6	11	*	17	7	6	13	9	9	3	3	42	44	35	11	17	107
Total Males	*	0	*	0	*	4	4	9	9	2	2	15	3	10	11	10	34
Total Females	6	11	*	17	7	2	9	*	*	1	1	27	41	25	*	7	73
1975-76																	
White Male	*	4	4	8	*	2	2	1	1	2	2	13	8	5	7	12	32
White Female	4	4	2	10	3	1	4	*	*	3	3	17	26	13	*	5	44
Total White	4	8	6	18	3	3	6	1	1	5	5	30	34	18	7	17	76
Black Male	*	0	4	4	*	1	1	1	1	*	*	6	4	1	1	*	6
Black Female	*	2	*	2	6	*	6	*	*	*	*	8	6	6	*	1	13
Total Black	*	2	4	6	6	1	7	1	1	*	*	14	10	7	1	1	19
Total	4	10	10	24	9	4	13	2	2	5	5	44	44	25	8	18	95
Total Males	*	4	8	12	*	3	3	2	2	2	2	19	12	6	8	12	38
Total Females	4	6	2	12	9	1	10	*	*	3	3	25	32	19	*	6	57

TABLE 4.7

DISTRIBUTION OF RETURNED QUESTIONNAIRES BY YEAR, PROGRAM, RACE AND SEX[a]

	ALL INSTITUTIONS					
	H	B/O	T/I	D	P	Σ
1974-75						
White Male	9	25	27	17	9	87
White Female	62	50	12	20	6	150
Total White	71	75	39	37	15	237
Black Male	4	12	11	5	1	33
Black Female	23	23	4	6	1	57
Total Black	27	35	15	11	2	90
Total	98	110	54	48	17	327
Total Male	13	37	38	22	10	120
Total Female	85	73	16	26	7	207
1975-76						
White Male	20	13	33	9	12	87
White Female	59	44	17	19	5	144
Total White	79	57	50	28	17	231
Black Male	4	3	8	6	*	21
Black Female	30	20	4	8	1	63
Total Black	34	23	12	14	1	84
Total	113	80	62	42	18	315
Total Male	24	16	41	15	12	108
Total Female	89	64	21	27	6	207
Both Years						
White Male	29	38	60	26	21	174
White Female	121	94	29	39	11	294
Total White	150	132	89	65	32	468
Black Male	8	15	19	11	1	54
Black Female	53	43	8	14	2	120
Total Black	61	58	27	25	3	174
Total	211	190	116	90	35	642
Total Male	37	53	79	37	22	228
Total Female	174	137	37	53	13	414

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[a] For an explanation of the abbreviations used in this table see pages 89 and 93.

TABLE 4.8

DISTRIBUTION OF RETURNED QUESTIONNAIRES IN THE DISTRIBUTIVE AREA BY YEAR, PROGRAM, RACE AND SEX[a]

	ALL INSTITUTIONS			
	HO	HP	TT	D
1974-75				
White Male	6	2	8	17
White Female	8	4	9	20
Total White	14	6	17	37
Black Male	0	2	3	5
Black Female	1	5	0	6
Total Black	1	7	3	11
Total	15	13	20	48
Total Males	6	4	11	22
Total Females	9	9	9	26
1975-76				
White Male	4	3	2	9
White Female	7	8	4	19
Total White	11	11	6	28
Black Male	1	5	0	6
Black Female	3	4	1	8
Total Black	4	9	1	14
Total	15	20	7	42
Total Males	5	8	2	15
Total Females	10	12	5	27
Both Years				
White Male	10	5	10	26
White Female	15	12	13	39
Total White	25	17	23	65
Black Male	1	7	3	11
Black Female	4	9	1	14
Total Black	5	16	4	25
Total	30	33	27	90
Total Males	11	12	13	37
Total Females	19	21	14	53

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[a] For an explanation of the abbreviations used in this table see pages 89 and 93.

Of some interest are the response rates by year. Surprisingly, the crude response rates for both years are virtually identical (41 percent). This covers up two underlying differences: the percentage of those males that were undelivered was considerably higher for 1975 than for 1976 (25.35 percent versus 21.89 percent), but the returns as percentage of those delivered was also higher for 1975 (55 percent) than 1976 (52 percent). It seems reasonable to conclude that follow up studies will encounter more difficulty locating respondents as the year of completion gets further from the time of the study, but the willingness of those contacted to respond may not decline significantly.

It is also of some interest to compare the response rates between the community colleges and the areawide vocational centers. A total of 440 questionnaires were returned from the 852 that were delivered to completers from the centers. This represents a 51.6% return compared to a 57.7 percent return from the community colleges, where 202 of the 350 delivered questionnaires were returned. This reflects the larger number of blacks at the vocational centers (particularly Lindsey Hopkins) and suggests that the completers from the centers may have lower socioeconomic backgrounds than those who attend the community colleges.

4.3 ADJUSTMENT FOR SMALL CELL OVERSAMPLING

The sampling procedure oversampled small cells and undersampled large cells since all observations were selected from those with fewer than ten observations, but only nine were selected from the larger cells. Thus, the returned questionnaires would not present a scaled down picture of the population even if a 100% response rate had been achieved. This can be seen by comparing the sampling frame and the selected sample.

Table 4.9 presents the distribution of the sampling frame by year, program area, race and sex. A sex breakdown of the health programs in 1976 was not available because of the problems with the emergency medical technology program referred to earlier. Table 4.10 contains the distribution of the selected sample by year, program area, race and sex. Of 6,448 potential respondents in the sampling frame, 1565 were mailed questionnaires, or 24.27%. However, 43.4 percent of the blacks in the sampling frame were mailed questionnaires (522 out of 1222) so that the sampling procedure considerably oversampled this race. This compared to just under 20 percent of the whites who were consequently undersampled.

In 1975, 797 were mailed questionnaires out of a total of 3288 (24.27%). Of these 308 males were included out of a possible 691 (44.5%) so that it can be concluded that males were also oversampled, and females were undersampled. These findings reflect the fact that the typical completer was a white female, and most small cells referred to males and/or blacks.

By program area, it is evident that health, the largest area, was greatly undersampled, but business/office and public service were greatly oversampled. Health completers amounted to less than 16 percent of the total available to be surveyed in this area, while business/office completers amounted to almost 40 percent, and public service amounted to over 45 percent. This reflected the predominance of whites in the health area, the predominance of blacks in the business/office area, and the predominance of males in the public service area.

The problems of over and undersampling required adjustments to the survey results to make them an accurate representation of the population. The procedure used was to "blow up" the survey sample to the population totals and to examine the percentage (rather than absolute number)

TABLE 4.9

DISTRIBUTION OF SAMPLING FRAME BY YEAR, PROGRAM AREA, RACE AND SEX[a]

	H	B/O	T/I	D	P	Σ
1974-75						
White Male	56	94	245	135	65	595
White Female	1006	491	131	379	8	2015
Total White	1062	585	376	514	73	2610
Black Male	9	38	31	15	3	96
Black Female	331	169	13	68	1	582
Total Black	340	207	44	83	4	678
Total	1402	792	420	597	77	3288
Total Males	65	132	276	150	68	691
Total Females	1337	660	144	447	9	2597
1975-76						
White Male	na	40	316	104	65	na
White Female	na	258	171	302	8	na
Total White	1372	298	487	406	73	2636
Black Male	na	15	44	18	0	na
Black Female	na	98	17	83	1	na
Total Black	248	113	61	101	1	524
Total	1620	411	548	507	74	3160
Total Males	na	55	360	122	65	na
Total Females	na	356	188	385	9	na
Both Years						
White Male	na	134	561	239	130	na
White Female	na	749	302	681	16	na
Total White	2434	883	863	920	146	5246
Black Male	na	53	75	33	3	na
Black Female	na	267	30	151	2	na
Total Black	588	320	105	184	5	1202
Total	3022	1203	968	1104	151	6448
Total Males	na	187	636	272	133	na
Total Females	na	1016	332	832	18	na

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[a] For an explanation of the abbreviations used in this table see pages 89 and 93.

na = not available.

TABLE 4.10

DISTRIBUTION OF THE SELECTED SAMPLE[a] BY YEAR, PROGRAM AREA, RACE AND SEX

	H	B/O	T/I	D	P	Σ
1974-75						
White Male	39	62	55	50	21	227
White Female	101	105	31	53	9	299
Total White	140	167	86	103	30	526
Black Male	4	32	28	14	3	81
Black Female	77	68	13	31	1	190
Total Black	81	100	41	45	4	271
Total	221	267	127	148	34	797
Total Males	43	94	83	64	24	308
Total Females	178	173	44	84	10	489
1975-76						
White Male	46	38	74	38	26	222
White Female	117	97	20	44	8	295
Total White	163	135	103	82	34	517
Black Male	14	14	29	18	0	75
Black Female	77	52	16	30	1	176
Total Black	91	66	45	48	1	251
Total	254	201	148	130	35	768
Total Males	60	52	103	56	26	297
Total Females	104	149	45	74	9	471
Both Years						
White Male	85	100	129	88	47	449
White Female	218	202	60	97	17	594
Total White	303	302	189	185	64	1043
Black Male	18	46	57	32	3	156
Black Female	154	120	29	61	2	366
Total Black	172	166	86	93	5	522
Total	475	468	275	278	69	1565
Total Males	103	146	186	120	50	605
Total Females	372	322	89	158	19	960

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[a] For an explanation of the abbreviations used in this table see pages 89 and 93.

breakdown of the population. Thus, if n_{ijklm} is the number of responses from year i, institution j, program k, race l and sex m, and if N_{ijklm} is the corresponding total, each questionnaire was counted as N_{ijklm}/n_{ijklm} questionnaires before aggregation to the population totals. One example of this adjustment is presented as Tables 4.11 and 4.12 namely, labor force breakdown.

Completers were asked to classify themselves into the categories: homemaker, retired, employed, military service, unemployed, student and "other". Respondents could choose more than one category (such as employed with student, homemaker or retired) but the coder chose the best description using answers to other questions on the questionnaire. Only full time employed persons were assigned to the employed category. The unweighted frequencies are given in Table 4.11; note they sum to 642, the number of questionnaires returned. One can compute an unemployment rate for VOTECH completers of 1975-76 by adding the employed to the unemployed and dividing the result into the unemployed. The unweighted frequencies give an unemployment rate of 9.6 percent which is considerably above the official figure which was below 8 percent during the sampling period. Recall, however, that blacks were oversampled and since they usually have a relatively high unemployment rate the unweighted results are easily explained.

The weighted frequencies sum to 6306, which is less than the 6448 in the sampling frame because of rounding errors in the weighting and blowing up procedure. What is more important are the sizeable changes in the relative frequencies. The unemployment rate, for example, is 7.9 percent for the completers when they are weighted by their relative important in the population. This figure is extremely close to the

TABLE 4.11

UNWEIGHTED FREQUENCIES: RESPONDENT'S LABOR FORCE STATUS

CATEGORY LABEL	ABSOLUTE FREQ	RELATIVE FREQ (PCT)	ADJUSTED FREQ (PCT)	CUM FREQ (PCT)
Homemaker	58	9.0	9.1	9.10
Retired	16	2.5	2.5	11.70
Employed	451	70.2	71.0	83.70
Military Service	6	.9	.9	83.60
Unemployed	48	7.5	7.6	91.20
Student	45	7.0	7.1	98.30
Other	11	1.7	1.7	100.00
No Response	7	1.1	Missing	100.00
TOTAL	642	100.0	100.0	

TABLE 4.12

WEIGHTED FREQUENCIES: RESPONDENT'S LABOR FORCE STATUS

CATEGORY LABEL	ABSOLUTE FREQ	RELATIVE FREQ (PCT)	ADJUSTED FREQ (PCT)	CUM FREQ (PCT)
Homemaker	833	13.2	13.4	13.40
Retired	72	1.1	1.2	14.60
Employed	4273	67.8	68.9	83.50
Military Service	24	.4	.4	83.90
Unemployed	366	5.8	5.9	89.80
Student	537	8.5	8.7	98.50
Other	94	1.5	1.5	100.00
No Response	107	1.7	Missing	100.00
TOTAL	6306	100.0	100.0	

official figure. It suggests that the unemployment rate among VOTECH completers from recent (recession) years was about the same as for all members of the labor force in Southeast Florida. Since the completers may be relatively better educated than the average member of the labor force one might anticipate a lower unemployment for them. However, many were without experience and belonged to high unemployment rate groups (blacks, females and under 24 years). In the tables that follow, only the weighted frequencies are reported.

4.4 A PROFILE OF POST SECONDARY VOCATIONAL AND TECHNICAL COMPLETERS

It was noted above, in the discussion of the sampling procedure, that the typical completer was a white female and it can also be noted that this white female probably attended one of the areawide vocational centers and graduated in the health area. A variety of additional information is available from the survey, however, so that the profile of the typical completer can be considerably expanded.

4.4.1 SOCIODEMOGRAPHIC CHARACTERISTICS

The typical completer is aged about 27, had a B average in high school, is married, employed full time at a job she likes a lot, earning an average annual income of $7,600, took the program to achieve a job objective, was satisfied with the program, and obtained a job within two months of completing the program. This statement represents a summary of Tables 4.13-4.21 where the typical respondent is defined as given the most common response. The tables are clear, so little further discussion is presented here. A few interesting characteristics are noted, and a number of caveats are issued to aid the reader in interpretation.

TABLE 4.13

AGE DISTRIBUTION OF POST SECONDARY VOCATIONAL AND TECHNICAL COMPLETERS

CATEGORY LABEL	RELATIVE FREQ (PCT)
17 - 25	41.3
26 - 35	23.1
36 - 50	19.8
51 Plus	12.5
No Response	3.3
TOTAL	100.0

TABLE 4.14

DISTRIBUTION OF HIGH SCHOOL GRADE POINT BY COMPLETERS

CATEGORY LABEL	RELATIVE FREQ (PCT)
Close to A	21.4
Close to B	47.3
Close to C	22.7
Below C	.7
GED	3.4
No Response	4.5
TOTAL	100.0

TABLE 4.15

MARITAL STATUS OF COMPLETERS

CATEGORY LABEL	RELATIVE FREQ (PCT)
Married	47.3
Single	33.1
Divorced-Separated	16.1
Widowed	2.3
No Response	1.1
TOTAL	100.0

TABLE 4.16

JOB SATISFACTION AMONG COMPLETERS

CATEGORY LABEL	RELATIVE FREQ (PCT)
Like It A Lot	47.1
Like It Somewhat	15.2
Dislike It Somewhat	2.9
Dislike It A Lot	2.0
No Response	32.8
TOTAL	100.0

TABLE 4.17

INCOME DISTRIBUTION OF COMPLETERS

CATEGORY LABEL	RELATIVE FREQ (PCT)
Below $4,000	5.2
$4,000 - $5,999	10.0
$6,000 - $7,999	12.6
$8,000 - $9,999	13.4
$10,000 - $11,999	10.8
$12,000 - $14,999	6.1
$15,000 - $19,999	2.6
$20,000 Plus	1.7
No Response or Not Employed	37.5
TOTAL	100.0

TABLE 4.18

MOST IMPORTANT REASON FOR ENROLLING IN VOCATIONAL AND TECHNICAL EDUCATION

CATEGORY LABEL	RELATIVE FREQ (PCT)
Job Prep	44.8
Retain Job	1.2
Promotion	4.5
New Occupation	25.4
Other	22.9
No Response	1.1
TOTAL	100.0

TABLE 4.19

RESPONSES TO THE QUESTION: WAS THE PROGRAM TO BLAME FOR GOALS NOT ACHIEVED?

CATEGORY LABEL		RELATIVE FREQ (PCT)
Yes		13.1
No		54.3
No Goals Not Achieved		19.7
No Response		12.9
	TOTAL	100.0

TABLE 4.20

RESPONSES TO THE QUESTION: DID RESPONDENT ACHIEVE A BETTER JOB AS A RESULT OF THE PROGRAM THAN WOULD HAVE BEEN ACHIEVED OTHERWISE?

CATEGORY LABEL		RELATIVE FREQ (PCT)
Yes		58.9
No		31.1
No Response		10.0
	TOTAL	100.0

TABLE 4.21

NUMBER OF MONTHS BEFORE FINDING A JOB

CATEGORY LABEL	RELATIVE FREQ (PCT)
One month	42.2
Two months	4.7
Three months	3.0
Four months	2.6
Five months	.9
Six months	4.0
Seven months	.2
Eight months	.1
Nine months	1.1
Ten months	.4
Eleven months	.5
Twelve months	4.7
Did Not Obtain Job	25.4
No Response	10.2
TOTAL	100.0

A particularly interesting feature of completers of vocational and technical education program is their age distribution. One out of every eight completers is over 50 years of age. Indeed, there were two responses from individuals over 80 years old. It is clear that any tendency to view post secondary vocational and technical education as a "next" step in the education of the young after high school should be quickly disabused. The clientele of the post secondary vocational and technical programs comes from a much broader group than recent high school graduates. This group includes mothers whose children have reached school age, divorced or separated homemakers, and the retired who may wish to supplement their pensions.

Two variables covered by this group of tables (high school) grade point and annual income) conventionally have lower response rates than most others in surveys. In addition, there is a tendency to under-report income and over-report grade point.

A number of respondents greatly enjoyed their programs and admired their teachers. They tended to desire to give the programs a good rating even if this involved answering questions inappropriately. Thus, they may never have been employed since the program ended and, hence, would have to answer the question whether the programs helped them get a better job negatively. Nevertheless they answered affirmatively because they were "sure" they could have obtained a better job if they had looked. There was no intention to deceive; they frequently noted their reason for answering in this manner.

On this subject, it is also clear that vocational and technical education serves a variety of purposes for those enrolled in it. In a world of uncertainty and imperfect information, individuals engage in exploratory schooling as well as schooling as an investment. For example, there is a definite tendency for individuals interested in nursing to the nurse's aide program first, then to try practical nursing and then registered nursing. The three nursing programs are linked like a ladder. The lower level programs are a cheap means of providing information to the uncertain high school graduate about a nursing career. Indeed some respondents noted that they had been disillusioned about their ability to perform in the educational system as high school students and academic success in a vocational program provided them with the courage to return to academic programs later in life.

4.4.2 THE SOCIOECONOMIC BACKGROUND OF COMPLETERS

Information on the socioeconomic background of respondents was collected by a series of questions as noted above. More than one question was needed because of the wide age distribution of vocational completers. An obvious method of measuring socioeconomic background would use the characteristics of the respondent's parents. On reflection, however, it is clear that the characteristics of a respondent's parents would have considerably less importance for a respondent's background if the latter had left home many years prior to enrolling in the vocational program. This is particularly true if socioeconomic background is to be used as a measure of an individual's ability to finance the accumulation of human capital. It is also true if background is regarded as a significant explanation for differences in tastes or preferences among individuals, that is, the social psychological model of educational choice, which stresses the effect of parental influence on the educational choices of siblings.

To construct socioeconomic background variables for completers who have left home two cases arise. A distinction must be made between those who are single, and those who are married. The ability of a single person to finance post secondary education is probably determined by his or her preprogram status, rather than the parents. The ability of a married person would depend on the characteristics of the spouse or on the individual's preprogram status. In this study, the socioeconomic background of the respondent was measured by the following rules. For all respondents under 26, the status of the parents were used. For respondents over 26, the respondent's preprogram status was used for males, and for those females married to males not in the labor force. The husband's status was used for married women over 26 if he was in the labor force.

To determine parental status, the respondent was first asked to identify which parent was the household head when he or she was a teenager (Table 4.22). Two indicators of socioeconomic status were used, namely, education (Table 4.23) and occupation. Occupation was scaled using skill levels corresponding to the Bureau of Census References Occupation Codes (Table 4.25), Siegel prestige scores (Table 4.26) and Duncan socioeconomic index scores (Table 4.27).

It was seen above (Table 4.15) that most respondents were married and Table 4.24 indicates that most were married to spouses who were employed. The spouse's educations are given in Table 4.23 and the skill levels, prestige scores and Duncan indexes for their occupations are given in Tables 4.25-4.27. Finally, the preprogram occupations and educations of the respondents were also collected. Education is given in Table 4.23 and occupation measured by the three scales is given in Tables 4.25-27.

The typical respondent came from a household headed by the father, who had no more than a high school education, and was either a high white collar or low blue collar worker. Married respondents had spouses with at least a high school education and those in the labor force usually

TABLE 4.22

HEAD OF HOUSEHOLD WHEN RESPONDENT WAS TEENAGER

CATEGORY LABEL		RELATIVE FREQ (PCT)
Father		77.9
Mother		18.2
Other		2.8
No Response		1.1
	TOTAL	100.0

TABLE 4.23

EDUCATION OF PARENT AND SPOUSE

		PARENT	SPOUSE	PREPROGRAM RESPONDENT
CATEGORY LABEL		RELATIVE FREQ (PCT)	RELATIVE FREQ (PCT)	RELATIVE FREQ (PCT)
Grade School		12.0	2.5	0.0
Some High School		28.4	14.5	20.6
High School Grad		31.2	34.6	50.5
Some College		8.0	23.8	21.0
College Grad Plus		13.9	22.1	5.3
No Response		6.4	2.5	2.6
	TOTAL	100.0	100.0	100.0

TABLE 4.24

PARENT, SPOUSE AND PREPROGRAM OCCUPATION: PRESTIGE SCORES

		PARENT	SPOUSE	PREPROGRAM
CATEGORY LABEL		RELATIVE FREQ (PCT)	RELATIVE FREQ (PCT)	RELATIVE FREQ (PCT)
0 - 9		.2	.2	3.3
10 - 19		3.0	2.2	13.6
20 - 29		17.6	5.8	23.0
30 - 39		15.8	11.4	21.4
40 - 49		30.6	20.1	.7
50 - 59		11.9	7.0	.6
60 - 69		3.2	6.0	1.0
70 - 79		6.1	2.1	0.0
80 - 89		.2	0.0	0.0
No Response		11.4	45.3	36.3
	TOTAL	100.0	100.0	100.0

TABLE 4.25

PARENT, SPOUSE AND PREPROGRAM OCCUPATION: DUNCAN SOCIOECONOMIC INDEX

		PARENT	SPOUSE	PREPROGRAM
CATEGORY LABEL		RELATIVE FREQ (PCT)	RELATIVE FREQ (PCT)	RELATIVE FREQ (PCT)
0 - 99		7.4	1.2	2.2
100 - 199		18.4	10.1	20.2
200 - 299		8.0	4.0	4.4
300 - 399		8.4	3.6	5.6
400 - 499		11.0	9.1	15.5
500 - 599		1.6	3.3	3.2
600 - 699		13.3	6.7	9.7
700 - 799		16.7	14.4	3.0
800 - 899		2.3	1.7	0.0
900 - 999		1.5	.7	0.0
No Response		11.4	45.3	36.2
	TOTAL	100.0	100.0	100.0

TABLE 4.26

LABOR FORCE STATUS OF SPOUSE

CATEGORY LABEL	RELATIVE FREQ (PCT)
Homemaker	3.7
Retired	2.7
Employed	51.2
Military Service	1.3
Unemployed	1.9
Student	.8
Other	2.1
Single	33.5
No Response	2.9
TOTAL	100.0

TABLE 4.27

PARENT, SPOUSE AND PREPROGRAM OCCUPATION: SKILL LEVEL

	PARENT	SPOUSE	PREPROGRAM
CATEGORY LABEL	RELATIVE FREQ (PCT)	RELATIVE FREQ (PCT)	RELATIVE FREQ (PCT)
High White Collar	30.9	22.4	4.0
Low White Collar	15.5	11.1	31.5
High Blue Collar	14.7	12.1	3.3
Low Blue Collar	25.6	12.2	25.2
Farm	2.2	0.0	0.0
Not In Labor Force	5.4	38.8	33.3
No Response	5.6	3.3	2.6
TOTAL	100.0	100.0	100.0

did not have low blue collar occupations. The typical respondent had graduated from high school and many had some post secondary education prior to attending the vocational program. The respondent usually had a low white collar or low blue collar occupation prior to enrolling in the program.

The educational attainment of respondents and their spouses is higher than their parents, but the education of spouses is higher than the education of the respondents (Table 4.23). The occupational scales indicate the occupations of spouses in the labor force were of higher status than the occupations of respondents prior to entry into the program. To compare the occupational status of parents to spouses, the difference in the rates of labor force participation should be included.(Table 4.25). This would result in 36.6 percent in high white collar, 18.2 in low white collar, 19.7 percent in high blue collar and 20 percent in low blue collar. This would lead to the conclusion that the average spouse had at least the same occupational status as the average parent, or even higher.

Some justification for measuring background by parental occupation for those under 26, and by preprogram occupation for single people over 25, and by spouse occupation for females over 25 married to members of the labor force is given in Tables 4.28 and 4.29. Table 4.28 shows what the respondents background would be if preprogram occupation was used for all completers regardless of age, sex and marital status. It is clear that those under 26 would be classified generally as low on the status scale, with low blue collar predominating for males, and low white collar predominating for females. Over one-fourth of the completers in that age group were not in the labor force before entering the program (that is, many did not have employment during

TABLE 4.28

PREPROGRAM STATUS BY SEX, AGE AND MARITAL STATUS

CATEGORY LABEL	MALES		FEMALES		
	17-25	26+	17-25	Single 26+	Married 26+
High White Collar	0	18.1	1.1	7.7	1.2
Low White Collar	23.5	38.0	38.8	30.4	29.9
High Blue Collar	3.9	12.7	0.3	2.3	0.4
Low Blue Collar	45.1	25.1	26.8	32.2	14.3
Not In Labor Force	27.5	6.1	33.0	27.4	54.2
TOTAL	100.0	100.0	100.0	100.0	100.0

TABLE 4.29

COMPUTED STATUS BY SEX, AGE AND MARITAL STATUS

CATEGORY LABEL	MALES		FEMALES		
	17-25	26+	17-25	Single 26+	Married 26+
High White Collar	40.0	18.1	26.4	7.7	36.4
Low White Collar	10.4	38.0	30.1	30.4	14.9
High Blue Collar	16.2	12.7	14.1	2.3	19.6
Low Blue Collar	13.4	25.1	21.9	32.2	17.3
Farm	0.0	0.0	0.7	0.0	0.0
Not In Labor Force	20.0	6.1	6.8	27.4	11.8
TOTAL	100.0	100.0	100.0	100.0	100.0

high school). For males, and single females, the labor force participation rate rises with age. For married females it declines.

In Table 4.29 the individual's background is measured according to the rules outlined in the first sentence of the preceding paragraph. The general conclusion is that the average socioeconomic background of youths is increased (because their parent's occupation is higher), and married females over 25 have higher backgrounds than before. Note also, that the proportion of married females for whom no background measure is available is reduced from 54.2 to 11.8 percent.

4.4.3 THE POST SECONDARY EDUCATIONAL EXPERIENCE OF COMPLETERS

Information was also gathered on each respondent's post secondary educational experiences. They were asked to list the programs they completed since high school, the institutions that offered them, the number of class contact hours per week, the number of months they attended the program and the year in which it was completed. In preparing the responses for the computer a very small number of programs that might be expected to have no effect on an individual's productivity in any job were excluded. An example of such a program would be safe boating lessons.

There was a wide variation in the meaning of a program, as interpreted by the respondents. Some listed a four-year college degree as a program; others listed a six-week short course of 24 hours conducted by an employer (such as IBS) as a program. Thus, any reporting of the raw results such as the number of programs completed or their average length would provide little information to the reader.

The following approach was adopted. Each program was converted to an equivalent number of full academic years, or fraction thereof. This was accomplished by dividing the number of class contact hours per week by 30 (the number of hours defined as a full-time week) and multiplying this by the number of weeks divided by 36 (the number of weeks defined as a full-time academic year):

$$\begin{array}{l}\text{Time in Program} \\ \text{Measured in Full-} \\ \text{Time Academic} \\ \text{Years}\end{array} = \frac{\text{Class contact hrs. per week}}{30} \times \frac{\text{Number of weeks in program}}{36}$$

The exception involved community college or senior college programs where it was assumed that one additional hour outside the classroom was required for every hour in the classroom. This converted 15 hours of such classroom work into 30 hours. It should be noted that college degrees, for example, were reported by most respondents as, simply, four years work so the above formula did not have to be applied.

Some idea of the effect of this approach can be obtained by considering the results for the sampled programs in the study. Information on the class contact hours and number of weeks was obtained from officials at the sampled institutions (registrars or guidance directors). The resulting estimates of schooling time per sampled program measured in full-time academic years is given in Table 4.30 for the vocational centers, and Table 4.31 for the community colleges.

A comparison of the two tables reveals that the programs at the community colleges are usually larger than those at the vocational centers. Most at the community colleges are two academic years. The most important exception is emergency medical technology which is only a course; dental hygiene and registered nursing is less than two years at institutions other than Miami Dade. At the vocational centers, the business and distributive programs tend to be relatively short; practical nursing is usually a year program but the other medical programs are also short. The technical programs are at least one year but usually take longer.

TABLE 4.30

TIME SPENT IN SAMPLED PROGRAMS
AT THE VOCATIONAL CENTERS
(Full-time Equivalent Academic Years)

CATEGORY LABEL	NORTH TECH	SHERIDAN	LINDSEY
Bookkeeping	0.33	.05	.085
Typewriting	0.33	.05	.085
Business Machines	0.33	.05	.085
Hotel Office	n.o.	.05	.375
Hotel PBX	n.o	.05	.375
Travel Ticketing	n.o	.05	.100
Practical Nursing	1.00	1.00	1.22
Nurses Aide	n.o.	.17	0.28
Hospital Ward Clerk	n.o.	.22	0.23
Air Conditioning	1.5	1.00	2.00
Auto Mechanics	1.5	1.00	n.o
Cosmetology	1.11	1.11	1.11

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n.o. = not offered

TABLE 4.31

TIME SPENT IN SAMPLED PROGRAMS
AT THE COMMUNITY COLLEGES
(Full-time Equivalant Academic Years)

CATEGORY LABEL	PALM BEACH	BROWARD	MIAMI DADE
Dental Hygiene	1.17	n.o	2.00
Registered Nursing	1.17	1.5	2.00
Emergency Medical Technology	n.o	n.o	.17
Secretarial Science	2.00	2.00	2.00
Office Management	2.00	2.00	2.00
Electronic Technology	n.o	2.00	2.00
Police Science	2.00	2.00	2.00

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n.o. = not offered

The totality of each respondent's post secondary educational experiences were estimated by summing the time spend in each post secondary vocational program. The result was added to 12, or less than twelve if that was the respondent's preprogram educational status. The frequency table of total number of years of schooling, as estimated in this manner is presented in Tabel 4.32.

One out of eight respondents (appropriately weighted) had fewer than twelve years of schooling. The overwhelming number of these were high school students taking courses at the vocational centers. Some courses at those centers do not require a high school diploma; in sampling, this was allowed for by only sampling those eighteen years old and above. In the analysis presented in the next section of this report, only those with at least eleven years of schooling are included (a high school diploma used to require this number of years). Respondents with the GED are credited with twelve years of education.

About 45 percent of the population of post secondary vocational and technical education completers had between twelve and thirteen years of schooling. This would be consistent with a high school diploma and a post secondary program. The vast majority of such completers would have attended the centers. Almost one in five completers had between 13 and 14 years of schooling. The remaining students from the vocational centers and some students from the community colleges would make up this group. A similar number had between 14 and 15 years, but most of these would be from the community colleges. About one in twelve completers had three to four years beyond high school. The 11.2 percent of completers with more than four years of post secondary schooling usually had completed a four year degree prior to entering the vocational program. Mothers returning to the labor force

TABLE 4.32
NUMBER OF YEARS OF SCHOOLING INCLUDING POST SECONDARY COURSES
(Academic Years)

CATEGORY LABEL	Relative Frequency (PCT)	Per Cent of Post Secondary
Below 12	12.6	0.0
12 - 12.9	39.0	44.6
13 - 13.9	15.9	18.2
14 - 14.9	15.0	17.2
15 - 15.9	7.7	8.8
16 - 16.9	4.5	5.1
17 +	5.3	6.1
	100.0	100.0

TABLE 4.33
RETURNS TO EDUCATION FOR POST SECONDARY VOCATIONAL AND TECHNICAL COMPLETERS

CATEGORY LABEL	Relative Frequency (PCT)
Below $300	9.0
$300 - $599	35.2
$600 - $899	39.7
$900 - $1199	12.0
$1200 +	4.1

after rearing their children belonged to this group, as did a number of retired persons.

The number of years of schooling received by an individual (particularly one with limited labor market experience as is true of most of the population studied here) is a measure of his or her human capital. The return on this capital can be approximated by dividing it into the individual's income:

$$\text{Return per year of schooling measured in dollars} = \frac{\text{individual's income}}{\text{individual's number of years of schooling}}$$

The rationale for this measure is similar to the method used to compute the return on a financial asset such as a savings account. If the income (interest) from a savings account is \$60, and the capital in the account is \$1,000, then the return on the account is \$60/\$1,000 = .06 or six percent. Because the income is measured in dollars and the capital is measured in dollars, the units of measurement (\$) cancel when the division occurs. In the formula above, the units of measurement in the numerator (\$) are different than those used in the denominator (years). Thus, the result is not a percentage -- it is measured in dollars per year.

The distribution of the returns to total education per year for the population studied here is given in Table 4.33. Most individuals realize a return of over \$600 per year. The average is about \$636.[3]

These returns can be converted to percentages if one assumes that the cost of the last year of education equals the foregone income. The average completer had an income of \$7,200. Thus, in the absence of the last year of education her income would have been \$6,564. Hence, the percentage return on that investment is about 636/6564 or 9.7 percent.

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[3] Some individuals will obviously make a higher rate of return than this figure, and others will make a lower return. In addition, the return presented here is a private rather than social return because it ignores government subsidies.

This rate of return is in line with the estimates made for general education by Becker (1964), Hansen (1963), Hanock (1965), Podoluk (1965). These writings represent the classic pioneering work in the literature on the returns to education. A rate of return of around 9 percent is also consistent with the competitive assumption, as noted by Mincer (1958), since it implies that the return on human capital is similar to the return on financial capital, measured by the long term interest rate (such as a mortgage rate). Finally, it should be noted that much of the literature since the pioneering work in the early 1960's has stressed the need to adjust their estimates downward for background and other variables (Welch 1974).

In view of this, it is surprising that previous studies of vocational education have uniformly found considerably higher rates of return than those reported here. Carroll and Ihnen (1967) estimates rates of return of 20.1 percent. Pejovich et al. (1969) estimated rates of return between 98 and 168 percent. Ghazalah (1972) estimated rates of return for different programs between 47.6 and 205.8 percent. Harris (1972) finds an average rate of return of 45 percent for completers of vocational programs in Florida. The cost figures are probably considerably understated, however, at the post secondary level since it is assumed that the opportunity cost of a student's time is the prevailing unskilled wage rate. This assumes that completers have no skills other than those contributed by the program. Stated differently, high school graduates would be employed at the prevailing unskilled wage rate.

The finding of a rate of return that is consistent with the general economics literature on returns to education, and with the predictions of the economic theory used in all the studies of the returns to education, is a significant contribution of this study and a major validation of the methodology. This study concludes that post secondary vocational education represents a profitably investment opportunity for those who pursue it. But the rate of return is a little above the return on financial capital, not several multiples of it.

At the same time, it should be noted that the methodology used here could be improved. It is assumed that post secondary students earn enough income to cover the out of pocket expenses of schooling such as tuition and classroom materials. This assumption could be relaxed. It is also assumed that each year of schooling contributes an identical marginal dollar return. Although this assumption is consistent with the usual finding of a declining marginal percentage rate of return for years of schooling, the slope of the marginal return is probably estimated subject to considerable error. Finally, it is assumed that the individual would have dropped out of the educational system if she had not enrolled in the vocational program.

In addition to these assumptions, there are some other weaknesses of rate of return methodology used here. The return is based on a comparison of income including taxes with private costs. Many researchers prefer to adjust income for taxes, but these researchers felt that the resulting refinement was not worth the probable cost of making the income figures more unreliable. More serious is the fact that the estimates are based on the completers initial employment experience rather than her lifetime. This limitation is inherent in the type of study pursued here.

4.4.4 THE LABOR FORCE EXPERIENCE OF POST SECONDARY VOCATIONAL COMPLETERS

The last area in which information was collected on the completers was their labor force history. A major intention of vocational education is job preparation and it can be seen from Table 4.20 that this is the most important reason why individuals enroll in vocational education. From Table 4.14, it can be seen that two-thirds of the completers were employed when the survey was conducted. This compares with one-third who were employed prior to enrolling in the program (Table 4.34).

Of course, it is clear that the rise in the employment rate of completers after their program is partly due to the increase in their age and, thus, their need to work. Further, the employment they obtained may not have been related to the skills acquired during the program. On the other hand, most of those surveyed indicated that the vocational program enabled them to obtain a better job than they would have achieved otherwise (Table 4.27).

Further insight into the effect of vocational education on employment can be obtained using the responses to the questions in the last part of the questionnaire. Completers were asked whether they looked for a job immediately after completing the program. Over 50 percent did so, but a surprising 40 percent did not (Table 4.35). Those who did not look for a job were given a number of reasons and asked to select the most appropriate (Table 4.36). The reasons were: continued in old job, had new job lined up prior to completion of the program, continued education, personal reasons such as pregnancy and an open ended "other" category. One out of every eight completers did not look for a job (13 percent) after completing the program. This accounts for over 5 percent of the 40 percent who did not seek a job. One-third of those who did not seek

TABLE 4.34
PREPROGRAM LABOR FORCE STATUS OF COMPLETERS

CATEGORY LABEL	Relative Freq. (PCT)
High School	17.4
Military Service	.9
Employed	34.0
Homemaker	27.8
Other	17.9
No Response	2.0
	100.0

TABLE 4.35
PER CENT OF COMPLETERS WHO LOOKED FOR A JOB IMMEDIATELY UPON COMPLETING THE PROGRAM

CATEGORY LABEL	Relative Freq. (PCT)
Looked	55.6
Did Not Look	40.3
No Response	4.0
	100.00

TABLE 4.36

REASONS WHY COMPLETERS DID NOT LOOK FOR A JOB UPON COMPLETING THE PROGRAM

CATEGORY LABEL	Relative Freq. (PCT)	Per Cent of all Completers
Continued in old job	33.9	13.6
Had new job lined up	13.0	5.3
Continued education	15.5	6.2
Personal reasons	23.4	9.4
Other	14.2	5.8
	100.0	40.3

TABLE 4.37

NUMBER OF JOBS HELD BY POST SECONDARY VOCATIONAL COMPLETERS SINCE THE PROGRAM

CATEGORY LABEL	Relative Freq. (PCT)
None[a]	25.3
One	45.5
Two	17.4
Three	6.9
Four +	4.9
Total	100.0

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[a] These individuals did not enter the labor force or continued in their old job at the same income level.

a job continued in their previous jobs, and somewhat under one-fourth did not enter the labor market for personal reasons such as illness or pregnancy. One out of seven continued their education.

The job market experience of those who held jobs since the program is summarized in Tables 4.37-4.39. Most individuals held no more than two jobs since their programs (Table 4.37). The majority of those employed found jobs related to the programs but as they changed jobs they gradually moved away from program-related employment (Table 4.38). At the time of the survey the majority were still in jobs related to their programs.

The majority of those employed at the time of the survey had jobs for which none of their post secondary programs were required by their employers (Table 4.37). Exceptions to this would most of the health and technical occupations. Most of those employed found their programs very helpful, and the one overwhelming majority found the programs of some help.

In summary, the average completer of post secondary vocational and technical programs had at least one year of post secondary education and those employed were realizing a return on this investment of over 9 percent. They had held one or two jobs since the program and these were related to the program. Most held jobs for which the program was not required but it was at least some help and usually very helpful.

TABLE 4.38

RELATIONSHIP OF JOBS HELD TO VOCATIONAL PROGRAM COMPLETED

JOB	Related? Yes	No	Total
One	76.6	23.4	100.0
Two	76.9	23.1	100.0
Three	65.7	34.4	100.0
Four	60.4	39.6	100.0

TABLE 4.39

RELATIONSHIP OF PROGRAMS COMPLETED TO JOB HELD

	Required?			Helpful			
Program	Yes	No	Total	No	Some	Very	Total
One	41.7	58.3	100.0	23.4	15.9	60.6	100.0
Two	49.4	50.6	100.0	10.6	29.8	59.6	100.0
Three	47.5	52.5	100.0	12.0	18.4	69.7	100.0
Four	39.2	60.8	100.0	24.5	15.5	60.0	100.0
Five	46.2	53.8	100.0	0.8	50.8	48.4	100.0

CHAPTER 5

THE EFFECT OF VOCATIONAL EDUCATION ON INEQUALITY

This chapter contains estimates of the effect of vocational education on inequality.

Two approaches to the estimation of the effect of post secondary vocational and technical education on income inequality may be taken. The first would compare the incomes of completers to the incomes of an equivalent sample of high school graduates with both groups classified by status. The relationship between income and personal characteristics could be established for all high school graduates and used to predict "expected income" figures for the vocational completers. The difference between each expected income figure and the corresponding actual income level of the completer could be called the contribution of post secondary vocational and technical education. Summing the contribution over the low status group yields the contribution to lower status people. In like manner, summing over upper status individuals would yield the contribution to the upper status group. If the contribution to the upper status group is larger than the contribution to the lower status group, the inequality of income would be increased. That is, the rich would be made richer more quickly than the poor. If the contribution to the upper status group is smaller than the contribution to the lower status group, the inequality of income would be reduced.

A second approach would be to sum the contribution of vocational education to each individual, where the contribution was measured in the manner outlined in the discussion of the rate of return on vocational education given above. An average return per year of education is obtained by dividing an individual's income by her number of years of schooling, in full time academic years. The number of years (or portion thereof) spent by the individual in the vocational program would be multiplied by the return per year to estimate the contribution of vocational education to her income. Summing over the members of each status, the ratio of the contribution made to the upper status group, to the contribution made to the lower status group is obtained. If this inequality ratio exceeds unity, post secondary vocational education enhances inequality. If the ratio is less than unity, inequality is reduced.

Although both approaches are followed as part of this study, the second approach received major emphasis for two reasons. First, much of the literature on returns to education suggests that among individuals who acquire the same amount of higher education there will be a negative correlation between social status and ability. The question that is posed is this: Why do two individuals from different social classes choose the same amount of education. The literature suggests that the lower class individual is constrained from proceeding further up the educational system by a lack of financial resources; the upper class individual is constrained by a lack of ability (defined to include motivation and drive). Thus, the ability variable will be an important distinction between the two status groups and the comparison between vocational completers and the general population by status group will be distorted accordingly. The contribution of vocational education to lower status individuals will be overstated because it is confounded with ability. The second problem with the comparison between completers and the general population will be the difference in the length of the vocational program pursued by the two groups. Because of the financial constraint, lower status individuals will pursue less higher education than upper status individuals with the same ability. Thus, the contribution of vocational education to these lower status individuals will be less than the contribution to upper status completers. In the comparison with the general population the situation is even more unclear. If the lower status individual from the general population has less higher education than the lower status completer, the comparison will yield a postive benefit to her. On the other hand, if the higher status individual from the general population has more higher education than the high status completer, vocational education will yield a negative contribution to her. The point is that the effect of programs of different length will introduce a bias in an indeterminate direction. These two problems leave aside the problem of matching the sample in other respects such as region of the country, year, and so on. The problem with the human capital approach, aside from the constant dollar return assumption, is that it assumes that the completer would have pursued no other higher educational alternative if the vocational system was not available. In brief, the comparison group would be the same individuals without the programs. This approach is not entirely accurate but appears to be the best available.

This chapter contains three sections. The first presents a comparison of the actual incomes of post secondary public vocational and technical completers with a sample of equivalent high school graduates from the Southern United States. Although there are reasons to doubt the accuracy of this approach, the analysis is presented here for completeness. The second, analyzes the inequality ratio for the population of completers as a whole using the human capital theory. The chapter concludes with an analysis of inequality by program.

5.1 COMPARISON OF COMPLETERS' INCOMES WITH THE GENERAL POPULATION

The basic aim of this section is to address the question of whether vocational and technical education increases or reduces income inequality by using a comparison group as the benchmark. The strategy is to determing the expected income of persons possessing all the characteristics of those in our sample save the single characteristic, completion of a VOTECH program. The expected income is then compared with the actual income of those in our sample, and the difference is presumed to contain the effect of VOTECH education. The expected income of each individual is derived from an ordinary least squares estimate and is thus the average income of individuals possessing those particular characteristics. The presumption, of course, is that the sample individual differs from other individuals of his particular social background, education, age and sex only in that he has received the benefit of VOTECH education whereas they have not. It has been argued above, however, that in at least two characteristics there will be a significant difference between the completers and the comparison group, namely, the distribution of ability and years of schooling by status group.

The sample used for comparison was drawn from the University of Michigan's Institute for Social Research panel study on income dynamics. This is a large continuing national study on the correlates of income attainment. A subsample of 1974 cases were drawn from this national sample according to the following criteria: all included had to be living in the South, had completed high school but not college, and had received no post secondary vocational training. For this group, a regression was run predicting income from parental background (3 dummy variables), race, age, and sex (1 dummy variable each). The sample was from 1970, so expected income was transformed to 1976 dollars.

The basic findings are presented in Table 5.1. This table shows, for age, race, sex and background categories, first the (sample-derived) actual average income of persons in the category, then the (equation-derived) expected average income of those in the category, and finally the actual minus expected figure. Considering the first case for an example. white males 25 and under from high white collar backgrounds with a high school education and vocational training earn $11,923 annually, on the average. A white male 25 and under from a high white collar background with a high school education and no vocational training would be expected to earn $11,849 annually, on the average. The difference, $74, is reported in the third column, and represents the average income benefit of VOTECH completion -- in this case, a quite small benefit.

The occupational categories used here result from a collapsing of standard census categories. The white collar/blue collar division is employed because of the enormous literature that documents substantial differences in aspirations, attitudes, and behavior between persons from these two groups. In terms of income alone (if we were seeking purely economic classes) the high white collar would be high income, the low white collar and high blue collar would be middle income, and the low blue collar would be low income.

Examination of the gain and loss across categories reveals some interesting patterns. White males from high white collar and low blue collar backgrounds clearly benefit from VOTECH training. Those from low white collar and high blue collar backgrounds do not benefit enough to bring them up to the average for their subcategory (for older white males there is slight benefit for those of high blue collar background as well).

TABLE 5.1

ACTUAL AND EXPECTED INCOME OF COMPLETERS BASED ON A COMPARISON GROUP

		White						Black					
		Male			Female			Male			Female		
Age	Status	Act.	Exp.	A-E	Act.	Exp.	A-E	Act.	Exp.	A-E	Act.	Exp.	A-E.
Under 26	High White Collar	11923	11849	74	8218	6675	1543	2000	9688	-7688	7973	4513	3460
	Low White Collar	9789	11683	-1894	8636	6590	2127	*	9522	*	7000	4348	2652
	High Blue Collar	8563	10362	-1799	9694	5203	4491	6431	8201	-1770	5399	3042	2357
	Low Blue Collar	9623	9066	557	8857	3892	4965	6148	6905	-757	6446	1731	4715
Over 26	High White Collar	14303	14082	221	8678	8909	-231	11000	11922	-722	7000	6748	252
	Low White Collar	12343	13917	-1574	6940	8743	-1803	13500	11756	1744	*	6583	*
	High Blue Collar	12679	12596	83	6486	7437	-951	12216	10435	1781	7000	5276	724
	Low Blue Collar	11508	11300	208	6840	6127	713	12203	9139	3064	9357	3966	5391

* = N too small for reliable results.

Females seem to gain substantially from VOTECH training, with the exception of older white females. In that group only those from low blue collar backgrounds earn more than would be expected given their characteristics. It is worth noting that the group who most consistently gain on their similars who have not attended VOTECH classes is those of low blue collar background. Those from the lowest income group, that is, gain most consistently on others from their same group. This finding supports the prediction that low status individuals in post secondary education will have more ability relative to the general population, while upper status individuals may even have less.[1] This distorts the conclusions based on a comparison as presented here.

We can ascertain the effect on income distribution by simply comparing the gain of high background persons with the gain of low background persons. We must, however, take into consideration the number of persons completing VOTECH training from each background in order to assess aggregate effects.

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[1] Along these lines see the statement by Rupert Evans (Evans 1976).

"But if I had to pick out one thing that I think we ought to be concentrating on, it is on the impact of the socioeconomic status of potential students and their differential success in the labor market as mediated by vocational education. I am convinced that socioeconomic status is real and changes people's lives in ways that sometimes are desirable and sometimes undesirable. I'm also convinced that we know very little about it as it affects vocational education. Just the simple fact that there's a negative correlation between socioeconomic status and verbal ability among post-secondary vocational and technical students, (that's the only population in which this negative correlation has even been found) is reason enough for looking closely at SES, its effects on vocational education, and the ways in which vocational education affects it. I'm sure it has something to do with decisions about who is tracked into vocational education and on those who choose to be tracked into vocational education in the secondary school. I'm sure SES has something to say about the ways in which certain segments of society do and don't support vocational education."

The most straightforward method is to multiply the gain from VOTECH (actual minus expected income) times the number of persons acquiring this gain, thus deriving a total aggregate income gain for each background group. We can then compare the aggregate gain of high status groups to that of lower status groups. If such a ratio exceeds one, it indicates a possible increase in inequality; if it is less than one it indicates a dimunition of inequality.

When we combine all categories and take the ratio of white collar to blue collar aggregate gain, the overall result is 0.26, indicating a reduction in inequality. Technically, it means that the white collar gain on other white collar non-vocational types is only 26% as great as the blue collar gain on other blue collar non-vocational types. But the result of this should be a narrowing of the white collar (blue collar income gap and thus a reduction of income inequality).

The reduction in inequality comes about because the relatively larger number of upper status individuals served by the system does not compensate for the larger gains received by the lower status persons. This finding should be interpreted with caution, however, because there is reason to believe that the higher gains by the lower status individuals reflect greater ability rather than vocational education.

But such combination oversimplifies a rather complex reality. Table 5.2 shows the same ratios for high and low white and blue collar groups. As can be seen , those from high white collar backgrounds gain over twice as much from VOTECH training as those from low white collar, and gain slightly more than those from high blue collar backgrounds, but they only gain 22% as much as those from low blue collar backgrounds. The table as a whole shows that the very top (high white collar) and very

TABLE 5.2

INEQUALITY RATIOS BY STATUS GROUP: ALL COMPLETERS (HIGH ONE LOW)

	White Collar		Blue Collar	
	High	Low	High	Low
High White Collar				
Low White Collar	2.37			
High Blue Collar	1.97	0.45		
Low Blue Collar	0.22	0.09	0.21	

TABLE 5.3

INEQUALITY RATIOS BY STATUS GROUP: WHITE FEMALES

	White Collar		Blue Collar	
	High	Low	High	Low
High White Collar				
Low White Collar	1.20			
High Blue Collar	0.99	0.83		
Low Blue Collar	0.97	0.80	0.97	

bottom (low blue collar) of the distribution gain on the middle of the distribution; high white collar moving further away from the middle, low blue collar moving closer to it.

Since the most typical VOTECH student is female, the ratios are recomputed for females only. Table 5.3 presents the ratios for white females and Table 5.4 presents them for black females. As can be seen, some of the results in Table 5.2 are primarily caused by blacks. For white females, the major effect of VOTECH education is a further separation of those from high and low white collar backgrounds (high white collar gain is 120% of the low white collar gain). White females from lower blue collar backgrounds gain only slightly on those from other backgrounds. For black females, by contrast, the low blue collar gain is enormous.

This analysis, by necessity, assessed the benefits of VOTECH training for members of a subgroup only in terms of other members of that same subgroup. For a fully adequate assessment of the effect of VOTECH on income inequality a broader comparison is needed -- one which can partially account for the unmeasured variables herein. For that we turn now to a different approach; one employing the methodology of human capital theorists.

5.2 THE OVERALL INEQUALITY RATIO DERIVED FROM HUMAN CAPITAL THEORY

An inequality ratio for post secondary vocational and technical education for Southeast Florida was calculated using the following formula:

TABLE 5.4

INEQUALITY RATIOS BY STATUS GROUP: BLACK FEMALES

	White Collar		Blue Collar	
	High	Low	High	Low
High White Collar				
Low White Collar	9.35			
High Blue Collar	0.92	0.10		
Low Blue Collar	0.05	0.01	0.05	

$$IR = \frac{\displaystyle\sum_{i=1}^{2}\sum_{j=1}^{6}\sum_{k=1}^{N_{ij}}\sum_{l=1}^{2}\sum_{m=1}^{2}\sum_{p=1}^{N^{u}_{ijklm}} \frac{y^{u}_{ijklmp}}{s^{u}_{ijklmp}} \cdot t_{jk}}{\displaystyle\sum_{i=1}^{2}\sum_{j=1}^{6}\sum_{k=1}^{N_{ij}}\sum_{l=1}^{2}\sum_{m=1}^{2}\sum_{p=1}^{N^{L}_{ijklm}} \frac{y^{L}_{ijklmp}}{s^{L}_{ijklmp}} \cdot t_{jk}}$$

Where

y^{u}_{ijklmp} = annual income of the p^{th} person of sex m, color l, program k, institution j upper class who completed year i

s^{u}_{ijklmp} = number of years of schooling of the p^{th} upper class person of sex m, color l, program k, institution j who completed in year i in full time equivalent academic years

N^{u}_{ijklm} = number of upper class persons of sex m and color l in program k at institution j who completed in year i

N_{ij} = number of (sampled) programs with completers from institution j in year i.

t_{jk} = time needed to complete program k at institution j in full time equivalent academic years.

The only difference between the numerator and denominator is that the symbols y_{ijklmp}, s_{ijklmp} and N_{ijklm} have u superscripts in the numerator and L superscripts in the denominator. This reflects the fact that the numerator refers to the upper classes and the denominator refers to the lower class.

The term $\frac{y_{ijklmp}}{s_{ijklmp}}$ is the p^{th} person's average annual return per year of schooling. This was observed in the last chapter to be about $640 for the population as a whole, but in the formula above the numerator refers to upper class individuals and the denominator refers to the lower class individuals. The term $\left(\frac{y_{ijklmp}}{s_{ijklmp}}\right) t_{jk}$ is the contribution of the k^{th} program at the j^{th} institution to the income of individual p. The series of Σ signs ensures that these contributions are summed over all individuals of both sexes and colors in all programs at all institutions in the two years for the upper class in the numerator and the lower class in the denominator. Thus IR is the contribution of post secondary vocational and technical education to those from upper socioeconomic backgrounds divided by the contribution of post secondary vocational and technical education to those from lower socioeconomic backgrounds. If this ratio is greater than one those from upper socioeconomic backgrounds benefit more than those from the lower groups. Conversely, if the ratio is less than one those upper backgrounds benefit less than those from the lower groups. Hence, if the ratio is greater than one post secondary vocational and technical education increases income inequality; if it is less than one it reduces income inequality. Note that the return on vocational and technical education can be greater for upper background people and the ratio still less than one if there are sufficiently fewer upper bakcgrounds completers.

The results of this procedure are given in Table 5.5. Three different methods of classifying individuals into upper and lower classes are used: skill (blue collar/white collar), socioeconomic status (essentially income) and prestige. These measures, it will be recalled were generated using occupation information on parents, spouses, and/or the individual prior to entering the program.

Looking at both years combined, the inequality ratios are all greater than unity suggesting that post secondary vocational and technical education increases class and income inequality, regardless of the status measure used. For both years, the inequality ratio is largest

TABLE 5.5

CONTRIBUTION OF VOCATIONAL EDUCATION TO COMPLETERS BY SOCIAL CLASS, BASED ON SKILL, SOCIOECONOMIC STATUS AND PRESTIGE, AND OVERALL INEQUALITY RATIOS FOR 1975, 1976 AND BOTH YEARS COMBINED

STATUS LEVEL	1975			1976			BOTH YEARS		
	SKILL[a]	SOCIOECONOMIC	PRESTIGE	SKILL	SOCIOECONOMIC	PRESTIGE	SKILL	SOCIOECONOMIC	PRESTIGE
High ($)	602,113	466,038	621,722	522,059	435,687	635,091	1,124,172	901,725	1,256,813
Low ($)	166,231	301,898	146,214	428,070	511,942	312,538	594,301	813,840	458,752
Inequality Ratio	3.62	1.54	4.25	1.22	0.85	2.03	1.89	1.11	2.74

[a] Blue Collar and White

if status is measured by prestige and lowest if it is measured by socioeconomic status. Indeed, the inequality ratio as measured by socioeconomic status in 1976 indicates that vocational education reduced income inequality for that cohort of completers. This may reflect a difference in the sampled programs but probably results from the weakness of that particular status measure.

Reflection will indicate that the inequality results of Table 5.5 may reflect a tendency for completers from high status backgrounds to complete lengthier programs compared to those from low status backgrounds. Given two students with equal ability and motivation, the one from the wealthier background will usually find it easier to finance post secondary education and, thus, may complete a longer program. Since longer programs will usually contribute more dollars to an individual's income, the inequality ratios may reflect the tendency of those in the higher groups to invest in longer programs.

The inequality ratios in Table 5.6 confirm the tendency of the inequality ratio to increase with the length of the program. The ratios for the shortest programs are lower than those for the two years combined regardless of the status measure employed. The inequality ratio based on the prestige measure reaches a maximum for the middle sized programs but this reflects the 1976 experience only.

The important conclusion is that vocational education appears to increase inequality even when the time spend by the students from the different backgrounds is taken into account. Only two of the nine inequality ratios are less than unity in Table 5.6 in the columns headed both years. These occur for the Duncan socioeconomic status measure and only one is significantly below unity.

TABLE 5.6

COMPUTATION OF INEQUALITY RATIOS FOR COMPLETERS CLASSIFIED BY LENGTH OF PROGRAM

PROGRAM LENGTH	STATUS LEVEL	1975			1976			BOTH YEARS		
		SKILL	SOCIOECONOMIC	PRESTIGE	SKILL	SOCIOECONOMIC	PRESTIGE	SKILL	SOCIOECONOMIC	PRESTIGE
0-.49	High($)	32,648	26,959	33,084	60,309	34,474	48,560	92,957	61,433	81,644
	Low($)	30,667	36,356	30,323	25,977	57,813	37,727	56,644	88,169	67,959
	Ratio	1.06	0.74	1.09	2.32	0.60	1.29	1.64	0.70	1.20
1.00-1.49[a]	High	204,568	144,737	207,193	145,732	125,978	222,030	350,300	270,715	429,223
	Low	66,192	125,618	63,159	131,925	151,678	55,626	198,117	277,296	118,785
	Ratio	3.09	1.15	3.28	1.10	0.83	3.99	1.77	0.98	3.61
2.00[b]	High	364,897	294,342	381,445	316,019	275,235	364,501	680,916	569,577	745,946
	Low	69,371	139,926	52,823	270,168	308,451	219,185	339,539	448,377	272,008
	Ratio	5.26	2.104	7.22	1.17	0.89	1.66	2.01	1.27	2.74
All Programs		3.62	1.54	4.25	1.22	0.85	2.03	1.89	1.11	2.74

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[a] No programs fall between .5 and .99 full time academic years.
[b] No programs fall between 1.50 and 1.99 full time academic years.

Since the inequality ratios increase with the length of the program, and since the community colleges tend to offer longer post secondary vocational programs, one would expect the inequality ratios for the community colleges to exceed those for the vocational centers. This expectation is confirmed by the data in Table 5.7, where the ratios are higher for the community colleges regardless of the status measure used.

If all completers received the same contribution (in dollars) from their vocational program to their incomes, the inequality ratio would simply be the ratio of the number of upper status completers to the number of lower status completers. Under these circumstances, a ratio above one would imply that vocational education enhanced income inequality because it served more upper status individuals than lower status individuals.

On the other hand, if there were exactly the same number of completers from the two status groups in the population, then the inequality ratio would reflect the different returns received by the two groups on their vocational education investments. That is, the inequality ratio can be written as

$$IR = \frac{\frac{\Sigma^u}{N^u}}{\frac{\Sigma^L}{N^L}} \cdot \frac{N^u}{N^L} = \frac{R^u}{R^L} \cdot \frac{N^u}{N^L}$$

Where

Σ = sum of the contributions of vocational education to the incomes of the status group

N = number of completers of the status group

R = average return received by the status group

TABLE 5.7

INEQUALITY RATIOS FOR VOCATIONAL CENTERS AND COMMUNITY COLLEGES BY STATUS MEASURE 1975, 1976 AND BOTH YEARS

	1975			1976			BOTH YEARS		
	SKILL	SOCIOECONOMIC	PRESTIGE	SKILL	SOCIOECONOMIC	PRESTIGE	SKILL	SOCIOECONOMIC	PRESTIGE
Vocational Centers	1.77	1.10	2.58	0.75	0.46	2.00	1.14	0.69	2.23
Community Colleges	6.30	1.96	6.64	1.72	1.26	2.05	2.78	1.53	3.18

and the superscript u denotes the upper status group, L denotes the lower group. The point is that the inequality ratio reflects the ratio of the average returns times the average completers. If the number of completers are equal for both groups, the ratio reflects the relative returns.

Table 5.8 contains the two ratios for both years and the two years combined for the three different status measures. The results indicate that for both years combined the return ratios are greater than unity, and the number ratios are greater than unity for two of the three status measures. The conclusion appears to be that upper status people realize a greater return from their vocational programs and that for two of the three measures the number ratios exceed unity as well. Vocational education enhances inequality because it serves more upper status individuals and because they make a higher return on their educational investments.

It is also interesting to examine how these ratios vary depending upon the length of the program completed, as given in Table 5.9. The results indicate that inequality is increased in the longer programs because upper status completers have the highest return, and because more of them complete the programs. The results confirm that upper class individuals tend to complete the longer programs, but the ratio of upper status return to the lower status value does not increase with the program length. Comparing 1975 with 1976, it is interesting to note that the ratios of numbers of completers change substantially in many completers. This suggests that the programs do not consistently draw the same relative mix of completers by status from year to year..

TABLE 5.8

RATIOS OF AVERAGE RETURNS AND TOTAL NUMBERS OF COMPLETERS BY STATUS

	1975			1976			BOTH YEARS		
	SKILL	SOCIOECONOMIC	PRESTIGE	SKILL	SOCIOECONOMIC	PRESTIGE	SKILL	SOCIOECONOMIC	PRESTIGE
Return Ratio	1.92	1.92	2.66	0.89	1.11	1.35	1.20	1.41	1.78
Number Ratio	1.88	0.80	1.60	1.37	0.77	1.50	1.58	0.78	1.54

TABLE 5.9

RATIOS OF AVERAGE RETURNS AND NUMBER OF COMPLETERS BY STATUS WITH LENGTH OF PROGRAM CONTROLLED

PROGRAM LENGTH	RATIO	1975			1976			Both Years		
		SKILL	SOCIOECONOMIC	PRESTIGE	SKILL	SOCIOECONOMIC	PRESTIGE	SKILL	SOCIOECONOMIC	PRESTIGE
0-.49	Return	1.04	1.34	1.15	1.30	0.92	1.18	1.20	0.70	1.17
	Number	1.02	0.55	0.95	1.78	0.72	1.09	1.37	0.64	1.03
1.00-1.49	Return	1.20	1.66	1.98	0.88	0.98	1.31	1.03	1.53	1.60
	Number	2.58	0.69	1.66	1.25	0.84	3.05	1.72	1.10	2.26
2.00	Return	0.91	1.12	1.32	1.21	1.14	1.22	1.08	1.27	1.21
	Number	5.79	1.86	4.70	0.97	0.78	1.36	1.86	1.14	2.28
all programs	Return	1.92	1.92	2.66	0.89	1.11	1.35	1.20	1.41	1.78
	Number	1.88	0.80	1.60	1.37	0.77	1.50	1.58	0.78	1.54

The status variables used in this analysis are not familiar to most people involved in vocational education. Emphasis in education has often been on sex and color as indicators of socioeconomic background. Inequality ratios for sex, color and age are given in Table 5.10. If males are regarded as the upper status group and females as the lower status group, the inequality ratio based on sex is less than unity. This reflects the predominance of females in post secondary vocational education, however, since the males realize a higher dollar return on their vocational programs (even when length of time is taken into account). The inequality ratio for Whites versus Blacks is very much greater than unity. This reflects the much greater number of Whites in the population, but it also reflects the tendency for Whites to realize a greater return, especially from the longer programs.

Table 5.10 also provides ratios based on age (using 35 years as the cut off). These ratios are not particularly useful, although they are presented for completeness. If one makes the questionable assumption that older people are a disadvantaged group, then the results indicate that younger people realize a higher return and that more young people are served by post secondary vocational education.

In summary, post secondary vocational and technical education enhances class and income inequality in Southeast Florida. This reflects the tendency of the system to provide services to more upper status than lower status individuals, and for upper status completers to realize a higher dollar return on their vocational education that lower status completers even when the length of the program is controlled.

TABLE 5.10

RETURN, NUMBER AND INEQUALITY RATIOS FOR COMPLETERS CLASSIFIED BY SEX, COLOR AND AGE

	1975			1976			BOTH YEARS		
	Male Female	White Black	Young Old	Male Female	White Black	Young Old	Male Female	White Black	Young Old
0-0.49									
Return Ratio	1.42	0.76	1.00	1.42	0.94	0.75	1.48	0.89	1.06
Number Ratio	0.28	2.7	0.56	0.57	5.46	6.77	0.40	3.67	1.57
Inequality Ratio	0.40	2.06	0.56	0.80	5.15	5.02	0.60	3.25	1.66
1-1.49									
Return Ratio	1.99	1.7	1.40	1.56	1.06	1.27	1.78	1.23	1.35
Number Ratio	0.44	26.2	4.37	0.44	9.45	3.99	0.44	14.02	4.18
Inequality Ratio	0.87	44.4	6.14	0.68	9.98	5.07	0.78	17.25	5.65
2.00									
Return Ratio	1.21	0.87	0.99	1.83	1.32	1.16	1.57	1.13	1.08
Number Ratio	0.29	5.46	2.38	0.49	6.67	2.88	0.40	8.03	2.65
Inequality Ratio	0.35	9.47	2.35	0.91	8.87	3.35	0.63	9.11	2.88
All Programs									
Return Ratio	1.60	2.08	2.14	1.63	1.31	0.85	1.63	1.63	1.45
Number Ratio	0.32	5.05	1.29	0.51	6.58	4.46	0.41	5.75	2.25
Inequality Ratio	0.52	10.49	2.76	0.82	8.64	3.80	0.67	9.38	3.25

5.3 INEQUALITY RATIOS BY VOCATIONAL PROGRAM

Inequality ratios for each of the programs included in the study are presented in Table 5.11 for both years combined using the three different status measures. In eight of the nineteen programs conflicting results are found depending on the status measure used (Table 5.12). In six of these eight cases, the socioeconomic measure conflicts with the skill and prestige based measures (which agree for seventeen of the nineteen programs). It will be argued below that in cases of conflict, the skill and prestige based measures can be expected to give more accurate results.

A classification of the programs' effect on inequality based primarily on the skill and prestige measures is given in Table 5.13. The results indicate that about two thirds of the programs enhance inequality and one third reduce it. It is noticeable that most of the longer programs increase inequality, while the shorter programs reduce it. The health and technical areas are split between programs that expand inequality and those that do not. The office, distributive and public service areas are dominated by programs that increase inequality.

Table 5.11 also contains return and number ratios which were computed to show whether the programs' inequality ratios were due to the mix of students that completed them, or were due to the differential returns received by students of alternative backgrounds. The programs are classified depending by their return ratios in Table 5.14. Again the socioeconomic measure is given least weight in the reclassification scheme. Comparing the results of this table with Table 5.13 it is clear that some programs from which low status completers obtain higher returns do not reduce inequality. This suggests that the effect on inequality for those programs (dental hygiene and secretarial science) reflects the mix of

TABLE 5.11

RETURN, NUMBER AND INEQUALITY RATIOS BY PROGRAM FOR BOTH YEARS COMBINED

Program		Skill	Duncan	Prestige
Nurses Aide	Return Ratio	0.76	0.73	0.71
	Number Ratio	0.48*	0.24*	0.58*
	Inequality Ratio	0.37	0.18	0.41
Practical Nursing	Return Ratio	0.87	1.09	1.38
	Number Ratio	1.70	0.65*	1.66
	Inequality Ratio	1.48	0.71	2.29
Registered Nursing	Return Ratio	1.11	1.11	1.09
	Number Ratio	2.89	2.89	3.64
	Inequality Ratio	3.23	3.23	4.00
Ward Clerk	Return Ratio	1.25	1.56	1.57
	Number Ratio	4.82	1.81	3.47
	Inequality Ratio	6.04	2.83	5.51
Dental Hygiene	Return Ratio	0.67	0.79	0.88
	Number Ratio	2.91	0.87	3.55
	Inequality Ratio	1.94	0.69	3.13
Emergency Medical	Return Ratio	1.34	1.04	1.11
	Number Ratio	1.20*	0.60*	0.71*
	Inequality Ratio	1.72	0.62	0.79
Air Conditioning	Return Ratio	1.06	n.c.	1.36
	Number Ratio	0.12*	n.c.	0.46*
	Inequality Ratio	0.13	n.c.	0.62
Auto Mechanic	Return Ratio	1.18	1.20	1.73
	Number Ratio	1.87	1.73	32.4
	Inequality Ratio	2.22	2.08	54.5
Cosmetology	Return Ratio	0.72	0.95	0.94
	Number Ratio	1.23*	0.43*	0.82*
	Inequality Ratio	0.90	0.40	0.77
Electronics	Return Ratio	1.79	1.77	1.83
	Number Ratio	2.23	2.53	3.07
	Inequality Ratio	4.12	4.51	5.84
Bookkeeping	Return Ratio	2.35	2.35	2.35
	Number Ratio	0.52*	0.52*	0.52*
	Inequality Ratio	1.25	1.25	1.25
Typing	Return Ratio	0.29	0.28	0.29
	Number Ratio	2.16	1.71	2.16
	Inequality Ratio	0.64	0.48	0.64
Business Machines	Return Ratio	1.49	1.51	1.96
	Number Ratio	1.16*	1.08	2.92
	Inequality Ratio	1.78	1.60	5.63
Hotel Office	Return Ratio	1.19	2.91	2.40
	Number Ratio	5.11	0.30*	0.66*
	Inequality Ratio	6.16	0.86	1.62

TABLE 5.11 (Cont.)

Program		Skill	Duncan	Prestige
Hotel PBX	Return Ratio	1.41	1.02	1.41
	Number Ratio	2.01	0.80	2.01
	Inequality Ratio	2.82	0.81	2.82
Travel Ticketing	Return Ratio	2.04	1.62	1.62
	Number Ratio	1.03*	0.31*	0.31*
	Inequality Ratio	2.12	0.51	0.51
Secretarial Science	Return Ratio	0.87	0.93	1.00
	Number Ratio	1.45*	0.47*	1.07*
	Inequality Rate	1.26	0.43	1.07
Management	Return Ratio	1.70	1.70	1.26
	Number Ratio	2.60	2.60	8.00
	Inequality Ratio	4.75	4.75	9.83
Police Science	Return Ratio	1.19	0.78	1.23
	Number Ratio	3.06	0.07*	3.69
	Inequality Ratio	3.65	0.05	4.58

---

n.c. = all completers from low socioeconomic status

* = disproportionately large number of low status completers. Overall number ratios for the three status measures are: skill = 1.57, socioeconomic = 0.78, and prestige = 1.54.

TABLE 5.12

EFFECTS ON INEQUALITY OF DIFFERENT VOCATIONAL PROGRAMS

	PROGRAMS THAT		
	REDUCE INEQUALITY UNAMBIGUOUSLY	REDUCE OR INCREASE INEQUALITY	INCREASE INEQUALITY UNAMBIGUOUSLY
Health	Nurse's Aide	Practical Nursing	Registered Nursing
		Dental Hygiene	Ward Clerk
		Emergency Medical	
Trade	Air Conditioning		Auto Mechanics
	Cosmetology		Electronics
Office and istributive	Typing	Hotel Office	Bookkeeping
		Hotel PBX	Business Machines
		Travel Ticketing	Management
		Secretarial Science	
ublic ervice		Police Science	

TABLE 5.13

EFFECTS ON INEQUALITY OF DIFFERENT VOCATIONAL PROGRAMS ADJUSTED FOR CONFLICTS AMONG STATUS MEASURES

AREA	REDUCE INEQUALITY	INCREASE INEQUALITY
Health	Nurse's Aide	Practical Nursing Registered Nursing
		Ward Clerk
	Emergency Medical	Dental Hygiene
Trade	Air Conditioning	Auto Mechanics
	Cosmetology	Electronics
Office and Distributive	Typing	Bookkeeping
	Travel Ticketing	Business Machines
		Management
		Hotel Office
		Hotel PBX
		Secreterial Science
Public Service		Police Science

TABLE 5.14

CLASSIFICATION OF RETURN RATIOS FOR THE VOCATIONAL PROGRAMS

	Higher Return for Lower Status	Lower Return for Lower Status
Health	Nurse's Aide	Practical Nursing
	Dental Hygiene	Registered Nursing
		Ward Clerk
		Emergency Medical
Trade	Cosmetology	Air Conditioning
		Auto Mechanics
		Electronics
Office	Typing	Bookkeeping
		Business Machines
		Hotel Office
		Hotel PBX
		Travel Ticketing
		Management
Public Service		Police Science

students who complete them. These programs are obvious candidates for a policy of incentives to increase enrollment or completions by lower status individuals. Three other programs provide relatively higher returns for lower status completers (nurses aide, cosmetology, and typing) but they reduce inequality suggesting that the mix of completers is not sufficiently in favor of upper status individuals to reverse the effect of the differential rates of return.

The programs are classified by the mix of completers from different backgrounds in Table 5.15. The classification was performed by comparing the number ratio for each program to the overall ratio of upper to lower status completers for all programs taken together (1.57 for skill, 0.78 for socioeconomic, and 1.54 for prestige). The socioeconomic measure suggests that post secondary vocational education serves mainly lower status individual, while the other measures serve suggest the reverse. This is one reason why the socioeconomic measure is given least weight in the analysis. Post secondary education requires a high school diploma and considerable financial resources. It is more likely that such individuals will come from upper status backgrounds.

The results in Table 5.15 confirm that the mix of completers of dental hygiene and secretarial science reverses the effect of the higher return received by lower status individuals on inequality. The table also shows that lower status individuals are relatively few in typing even though they receive a relatively higher return. On the other hand, there are relatively many lower status individuals in emergency medical technology, air conditioning, bookkeeping, hotel office and travel ticketing although they recieve relatively lower returns. Some individuals in these programs might do better if guided into alternatives.

TABLE 5.15

PROGRAMS CLASSIFIED BY PROPORTIONAL REPRESENTATION OF LOW STATUS COMPLETERS

	DISPROPORTIONATELY MANY LOWER STATUS COMPLETERS	DISPROPORTIONATELY FEW LOWER STATUS COMPLETERS
Health	Nurse's Aide	Registered Nursing
	Emergency Medical	Ward Clerk
		Practical Nursing
		Dental Hygiene
Trade	Air Conditioning	Auto Mechanics
	Cosmetology	Electronics
Office	Bookkeeping	Typing
	Hotel Office	Business Machines
	Travel Ticketing	Hotel PBX
	Secretarial Science	Management
Public Service		Police Science

It is interesting to analyze the differences between the low status completers who chose the high return programs (nurse's aide, dental hygiene, cosmetology and typing) and the low status completers who did not. This was investigated using discriminant analysis. It appeared likely that the low status completers who chose the higher return programs would be distinguished from those completers who chose the lower return programs in their status, grade point average, race, age and sex. The averages for these variables for both groups are presented in Table 5.16. It can be seen that low status individuals who completed the high return programs tended to be of lesser status, with higher grade points, more likely to be Black, young and female than those who did not. That is, young Black females with relatively high grade points from low socioeconomic status tend to be the most successful in comparison to high status completers.

The relative importance of these characteristics can be judged using the standardized discriminant function coefficients in Table 5.17. These tell the effect of the listed variables on the probability of a low status individual being more successful than a completer from a high social background. The largest coefficient is for sex, suggesting that the dominant characteristic of successful low status completers is that they are female. The second and third most important characteristics are low status (within the low status group) and youth; after that comes race (black) and least important is ability (as measured by grade point).

One interpretation of these results is that the program offerings of post secondary vocational education in Southeast Florida are adequate for young females of low status, but may be inadequate for males and

TABLE 5.16

AVERAGE VALUES OF SELECTED VARIABLES FOR LOW STATUS COMPLETERS WHO COMPLETED HIGH RETURN VERSUS LOW RETURN PROGRAMS

	High Return	Low Return	All Programs
Status[a]	3.7	3.5	3.6
High School Grade Point[b]	2.06	2.20	2.16
Race[c]	4.0	4.9	4.6
Age[d]	28.3	32.4	31.2
Sex[e]	1.9	1.7	1.8

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[a] High values on this scale indicate low status (blue collar).

[b] 1 = close to A, 2 = close to B, 3 = close to C.

[c] 2 = Black 6 = White

[d] in years.

[e] 1 = Male 2 = Female

TABLE 5.17

STANDARDIZED DISCRIMINANT FUNCTION COEFFICIENTS FOR LOW STATUS COMPLETERS CHOICE OF PROGRAM[a]

Status	.38
High School Grade Point	-.08
Race	-.23
Age	-.37
Sex	.71

---

[a] These coefficients give the change in the probability that a low status completer will select a high return program as the value of the variable increases. See the footnotes to Table 5.16 for the meaning of an increase in the variable.

older females. Vocational education policies to improve the disadvantaged may need to pay more attention to males and older females.

CHAPTER 6

A SURVEY OF STUDENTS CURRENTLY ENROLLED IN POST SECONDARY VOCATIONAL AND TECHNICAL PROGRAMS

The results of the survey of completers showed a variation in the numbers of completers from different socioeconomic backgrounds who completed the sampled programs. Since the return from these programs also varied by socioeconomic background, an appropriate question would be why individuals from different backgrounds have a tendency to complete some programs more frequently than others. Two aspects of this question could be answered by making a survey of students currently enrolled. First, it could be ascertained whether the propensity of students from low backgrounds to complete certain programs reflected a different success rate rather than a different enrollment rate in these programs. Second, the motivations and aspirations of students currently enrolled could be compared to the experiences of those who had completed the same programs. Thus, a survey of students currently enrolled in the selected vocational and technical programs was undertaken. In point of fact, this survey was carried out in Spring 1977, before the survey of completers because many programs have no enrollment during the summer months.

6.1 SAMPLING METHODOLOGY

The survey of students currently enrolled was performed by selecting one class from each program at each institution and administering a questionnaire. The classes were not selected randomly, and all students in the selected classes were surveyed. The classes were selected to yield a sample of at least twenty five post secondary students (where possible). In addition, more advanced classes were selected relative to less advanced ones. Finally, classes were selected to minimize the number of trips made by the survey administrators, and to minimize inconvenience to the staff and students at the various institutions. It was not possible to survey registered nurses at Palm Beach Junior College because it was so late in the academic year. A random sample of the class were surveyed partly by mail and partly by interview.

The questionnaire developed for the in class survey is given as Appendix B to this report. An earlier version was pretested on a criminal justice program at Florida Atlantic University. The final version contained many of the same questions as the completer survey. It also contained questions on why the respondent chose the program and institution he or she was attending such as the individuals who were consulted about the choice and the cost and proximity of the institution. The individual was also asked information on his or her next year plans, and those hoping to be employed were asked how much income they expected to obtain from the program.

6.2 A PROFILE OF THE RESPONDENTS TO THE IN CLASS SURVEY

Because of the unscientific nature of the sampling for the in-class survey the overall picture of a student enrolled in post secondary and technical education is not likely to be a very accurate representation of the population. The typical respondent by program, however, can be of considerable value for analysis. Before examining the individual programs, an overview of the respondents to the in-class survey in presented.

From Tables 6.1 and 6.2 it can be seen that there were more respondents to the in-class survey from the community colleges (53 percent) than from the vocational centers, even though there are considerably more completers from the centers than from the colleges (40 percent). As a result

TABLE 6.1

IN CLASS RESPONDENTS BY INSTITUTION

CATEGORY LABEL	ABSOLUTE FREQ	RELATIVE FREQ (PCT)
No. Tech	66	10.3
Sheridan	139	21.8
Lindsey	92	14.4
Palm Beach Jr. Coll.	93	14.6
Broward Community Coll.	91	14.2
Miami Dade Community Coll.	158	24.7
TOTAL	639	100.0

TABLE 6.2

IN CLASS RESPONDENTS BY PROGRAM

CATEGORY LABEL	ABSOLUTE FREQ	RELATIVE FREQ (PCT)
Nurse's Aide	19	3.0
Practical Nursing	74	11.6
Nursing Degree	77	12.1
Hosp. Ward Clerk	15	2.3
Dental Hygiene	57	8.9
Emergency Medical	23	3.6
Air Conditioning	25	3.9
Auto Mechanics	27	4.2
Cosmetology	47	7.4
Electronics	23	3.6
Bookkeeping	25	3.9
Typing	19	3.0
Business Mach.	11	1.7
Hotel Office	15	2.3
Hotel PBX	16	2.5
Travel Ag Tech	4	.6
Secretarial Science	51	8.0
Management	40	6.3
Police Science	71	11.1
TOTAL	639	100.0

most of the community college programs (nursing, dental hygiene, electronics, secretarial science and police science) are overstated in Table 6.2. This results from the sampling rather than reflecting any change in enrollment.

The race and sex distributions of the in-class respondents (Tables 6.4 and 6.5) are relatively close to those of the completers. The in-class respondents are younger as might be extected (Table 6.3) but the average age is not more than a year or so different from the average age a completer might be presumed to have been when enrolled in the programs. A considerably smaller percentage of in-class students were married (31 percent) than completers (47.3 percent) but this reflects the age difference between the two groups (Table 6.6).

Most of the in-class respondents were not employed (63.4) which contrasts sharply with the completers (Table 6.7). While this difference is also to be expected it may be exaggerated by the disproportionate number of community college students that were surveyed. Over one-third of the in-class respondents were full time students. Even among the employed most had part time jobs (Table 6.8). As a result, the average income of in-class students (who were employed) was about $5,100 which is considerably less than $7,200 income of employed completers.

The majority of the in-class respondents came from white collar backgrounds (Table 6.10). The most significant differences between the status of in-class students and the completers is in the "not in the labor force" row. All groups of students except males over 25 had lower proportions "not in the labor force" (that is, their parent, spouse of they themselves were not in the labor force depending on whose occupation was used to compute status). It is not immediately obvious why one in six males over 25 were neither employed nor seeking a job prior to entering the vocational program.

TABLE 6.3

IN CLASS RESPONDENTS BY AGE

CATEGORY LABEL	ABSOLUTE FREQ	RELATIVE FREQ (PCT)
Below 18	23	3.6
18 - 23	350	54.8
24 - 33	140	21.9
36+	116	18.1
No Response	10	1.6
TOTAL	639	100.0

TABLE 6.4

IN CLASS RESPONDENTS BY SEX

CATEGORY LABEL	ABSOLUTE FREQ	RELATIVE FREQ (PCT)
Male	193	30.2
Female	446	69.8
TOTAL	639	100.0

TABLE 6.5

IN CLASS RESPONDENTS BY COLOR

CATEGORY LABEL	ABSOLUTE FREQ	RELATIVE FREQ (PCT)
Black	110	17.2
White	529	82.8
TOTAL	639	100.0

TABLE 6.6

MARITAL STATUS OF IN CLASS RESPONDENTS

CATEGORY LABEL	ABSOLUTE FREQ	RELATIVE FREQ (PCT)
Married	198	31.0
Single (Widowed, Divorced etc.)	441	69.0
TOTAL	639	100.0

TABLE 6.7

OCCUPATIONAL STATUS OF IN CLASS RESPONDENTS

CATEGORY LABEL	ABSOLUTE FREQ	RELATIVE FREQ (PCT)
Homemaker	39	6.1
Retired	10	1.6
Employed	210	32.9
Military Service	2	.3
Seeking Full-Time Job	116	18.2
Full Time Student	234	36.6
Other	16	2.5
No Response	12	1.9
TOTAL	639	100.0

TABLE 6.8

HOURS WORKED PER WEEK

CATEGORY LABEL	ABSOLUTE FREQ	RELATIVE FREQ (PCT)
0 - 20	120	18.8
20 - 40	146	22.8
40+	87	13.6
Not Employed	283	44.3
No Response	3	.5
TOTAL	639	100.0

TABLE 6.9

INCOME OF IN CLASS RESPONDENTS

CATEGORY LABEL	ABSOLUTE FREQ	RELATIVE FREQ (PCT)
$0-$4,000	169	26.4
$4,001-$6,000	63	9.9
$6,001-$8,000	36	5.6
$8,001-$10,000	32	5.0
$10,001-$15,000	27	4.2
$15,001-$20,000	11	1.7
$20,000+	2	.3
Not Employed	282	44.1
No Response	17	2.7
TOTAL	639	100.0

TABLE 6.10

STATUS OF IN CLASS COMPLETERS BY SEX, AGE AND MARITAL STATUS

	MALES		FEMALES		
Category Label	17-25	26+	17-25	Single 26+	Married 26+
High White Collar	46.2	18.2	30.8	10.7	29.1
Low White Collar	17.9	24.2	23.1	26.8	21.9
High Blue Collar	17.9	16.7	20.7	0.0	21.9
Low Blue Collar	17.1	24.2	20.4	41.1	18.8
Farm	0.0	0.0	0.4	0.0	0.0
Not in Labor Force	0.9	16.7	4.6	21.4	8.3
Total	100.0	100.0	100.0	100.0	100.0

Most in-class respondents had 12 years of education (high school) although about 30 percent had more (Table 6.11). Most of these latter had one to two years beyond high school (five-sixths of the 30 percent) and this largely reflected their stage in the community college system where most programs surveyed took two years and senior students were selected for the sample.

The in-class students had relatively higher grade point averages (Table 6.12) but this may have reflected the community college emphasis of the sample. Over 50 percent of the sample had class contact hours up to 20 per week and most of these students may have been at the colleges (Table 6.13); the overwhelming majority of the students surveyed attended school only in the daytime (Table 6.14).

A number of questions were asked to ascertain why students selected the institution and program that they attended. Table 6.15 indicates that proximity to home or job was the most important reason for selecting the institution, although many students had apparently ruled out a more expensive alternative. Preparation for a job was the most important reason for selecting the program (Table 6.16). Family members and friends were the major advisors consulted by students in making their choices; high school counselors and representatives of the post secondary institutions were only of moderate influence (Table 6.17).

About 60 percent of the students surveyed expected to be employed next year; the remainder expected to continue their training (Table 6.18). The overwhelming majority expected the program they were attending to assist them in performing on the jobs they hoped to obtain (Table 6.19). The average student anticipated a salary next year of about $9300. This was over $2000 more than the experience of the completers. Even when

TABLE 6.11

YEARS OF EDUCATION OF IN CLASS RESPONDENTS

CATEGORY LABEL	ABSOLUTE FREQ	RELATIVE FREQ (PCT)
Less Than High School	57	8.9
High School	382	59.8
Some College	197	30.8
No Response	3	.5
TOTAL	639	100.0

TABLE 6.12

HIGH SCHOOL GRADE POINT OF IN CLASS RESPONDENTS

CATEGORY LABEL	ABSOLUTE FREQ	RELATIVE FREQ (PCT)
Close to A	147	23.0
Close to B	313	49.0
Close to C	144	22.5
Below C	2	.3
GED	25	3.9
No Response	8	1.3
TOTAL	639	100.0

TABLE 6.13

CLASS CONTACT OF IN CLASS RESPONDENTS

CATEGORY LABEL	ABSOLUTE FREQ	RELATIVE FREQ (PCT)
0 - 10	155	24.3
11 - 20	186	29.1
21 - 25	72	11.3
26 - 30	128	20.0
More Than 30	72	11.3
No Response	26	4.1
TOTAL	639	100.0

TABLE 6.14

TIME OF ATTENDANCE AT CLASSES

CATEGORY LABEL	ABSOLUTE FREQ	RELATIVE FREQ (PCT)
Daytime	528	82.6
Evening	59	9.2
Day and Evening	52	8.1
TOTAL	639	100.0

TABLE 6.15

REASONS WHY INSTITUTION WAS CHOSEN

CATEGORY LABEL	ABSOLUTE FREQ[a]
Where Friends Go	28
Costs Less Here	239
Advised to go Here	152
Closest to Home/Job	291
Only Place Program Offered	174
Other Reasons	116

[a] Respondents could check more than one response.

TABLE 6.16

MOST IMPORTANT REASON FOR CHOOSING PROGRAM

CATEGORY LABEL	ABSOLUTE FREQ	RELATIVE FREQ (PCT)
Prepare for Job	399	62.4
Promotion	53	8.3
Keep Job	2	.3
Prepare to Change Jobs	108	16.9
Other	67	10.5
No Response	10	1.6
TOTAL	639	100.0

TABLE 6.17

INFLUENCE OF VARIOUS PEOPLE ON PROGRAM CHOICE[a]

		ABSOLUTE FREQUENCY	
CATEGORY LABEL	NO HELP	SOME HELP	VERY HELPFUL
High School Counselors	294	101	87
Family Members	106	157	275
Friends	162	189	176
Post Secondary Representatives	269	107	81
Others	80	12	92

[a] Multiple responses were requested.

TABLE 6.18

NEXT YEAR'S PLANS

CATEGORY LABEL	ABSOLUTE FREQ	RELATIVE FREQ (PCT)
Job	383	59.9
Training	184	28.8
Homemaking	4	.6
Military	4	.6
Other	49	7.7
No Response	15	2.3
TOTAL	639	100.0

TABLE 6.19

ANSWERS TO THE QUESTION: DO YOU EXPECT THIS PROGRAM TO PROVIDE YOU WITH SKILLS THAT WILL ASSIST YOU IN PERFORMING ON THE JOB YOU HOPE TO GET?

CATEGORY LABEL	ABSOLUTE FREQ	RELATIVE FREQ (PCT)
Yes	567	88.7
No	17	2.7
Will Not Be Employed	20	3.1
Other	11	1.7
No Response	24	3.8
TOTAL	639	100.0

TABLE 6.20

EXPECTED INCOME OF IN CLASS RESPONDENTS

CATEGORY LABEL	ABSOLUTE FREQ	RELATIVE FREQ (PCT)
$0-$4,000	26	4.1
$4,001-$6,000	50	7.8
$6,001-$8,000	110	17.2
$8,001-$10,000	113	17.7
$10,001-$15,000	140	21.9
$15,001-$20,000	28	4.4
$20,000+	17	2.7
Not Employed	121	18.9
No Response	34	5.3
TOTAL	639	100.0

the greater portion of community college programs are accounted for (where programs are longer), and when an allowance is made for inflation, it appears that students currently enrolled have higher expectations than their predecessors have realized.

6.3 COMPARISON OF AVERAGE STATUS BETWEEN CURRENTLY ENROLLED STUDENTS AND COMPLETERS

One possible explanation for the differences in completion rates by program between low and high status individuals is a difference between their success rates (or drop out rates). That is, relatively few low status individuals may complete dental hygiene and secretarial science in spite of the relatively high return they can obtain, for example, because of a relatively high dropout rate for low status students in those programs.

The optimal method of analyzing this issue would be to compare those who complete to those who did in at least one year. Such data are not available to these researchers. Some insight into the issue, however, can be obtained by comparing the average status of students currently enrolled in each program with the average status of those who have completed. This comparison will yield some insight into the issue provided the average status of completers and those currently enrolled does not change significantly over time. If this condition is violated, the reasons for the alteration in the status mix would themselves yield considerable insight into the problem.

The average status of students enrolled and completers is given by program for each of the three status measures in Tables 6.21-6.24. Each status measure gives the same results except for three of the last four programs. If the majority finding is taken (higher versus lower), then ten programs have enrolled students with lower status than completers, and nine have the opposite. There is no tendency, therefore, for completers

TABLE 6.21

COMPARISON OF AVERAGE STATUS BASED ON SKILL BETWEEN CURRENTLY ENROLLED STUDENTS AND COMPLETERS[a]

	IN CLASS	COMPLETERS	RELATION OF IN CLASS STATUS TO COMPLETERS' STATUS
Nurse's Aide	3.1	2.7	lower
Practical Nursing	2.7	2.3	lower
Registered Nursing	2.2	2.1	lower
Hospital Ward Clerk	2.3	1.9	lower
Dental Hygiene	1.72	1.75	higher
Emergency Medical	1.7	2.6	higher
Air Conditioning	2.3	2.8	higher
Auto Mechanics	2.2	1.8	lower
Cosmetology	2.6	2.2	lower
Electronics	2.3	1.7	lower
Bookkeeping	2.6	2.1	lower
Typing	2.4	2.9	higher
Business Machines	3.4	2.9	lower
Hotel Office	2.2	2.6	higher
Hotel PBX	3.0	2.3	lower
Travel Ag. Tech.	1.6	2.0	higher
Secretarial Science	2.4	2.6	higher
Management	1.9	2.1	higher
Police Science	2.1	2.0	lower

[a] On this scale, low values indicate high status (white collar), and high values indicate low status (blue collar).

TABLE 6.22

COMPARISON OF AVERAGE STATUS BASED ON SOCIOECONOMIC CHARACTERISTICS BETWEEN CURRENTLY ENROLLED STUDENTS AND COMPLETERS[a]

	IN CLASS	COMPLETERS	RELATION OF IN CLASS STATUS TO COMPLETERS' STATUS
Nurse's Aide	3.2	3.8	lower
Practical Nursing	4.5	4.9	lower
Registered Nursing	5.2	5.6	lower
Hospital Ward Clerk	4.6	5.8	lower
Dental Hygiene	6.5	6.2	higher
Emergency Medical	5.4	4.8	higher
Air Conditioning	4.7	3.8	higher
Auto Mechanics	5.0	6.2	lower
Cosmetology	4.2	5.0	lower
Electronics	4.5	7.1	lower
Bookkeeping	4.2	5.4	lower
Typing	4.5	3.8	higher
Business Machines	2.9	4.2	lower
Hotel Office	5.0	4.2	higher
Hotel PBX	3.7	5.2	lower
Travel Ag. Tech.	6.3	5.5	higher
Secretarial Science	4.5	4.2	higher
Management	5.5	5.8	lower
Police Science	5.6	5.4	higher

[a] On this scale, high values indicate high status (income), and low values indicate low status (income).

TABLE 6.23

COMPARISON OF AVERAGE STATUS BASED ON PRESTIGE BETWEEN CURRENTLY ENROLLED STUDENTS AND COMPLETERS[a]

	IN CLASS	COMPLETERS	RELATION OF IN CLASS STATUS TO COMPLETERS' STATUS
Nurse's Aide	3.9	4.2	lower
Practical Nursing	4.4	4.5	lower
Registered Nursing	4.8	5.1	lower
Hospital Ward Clerk	4.5	4.7	lower
Dental Hygiene	5.6	5.1	higher
Emergency Medical	5.3	4.4	higher
Air Conditioning	4.217	4.214	higher
Auto Mechanics	4.6	5.2	lower
Cosmetology	4.3	4.8	lower
Electronics	4.4	5.8	lower
Bookkeeping	4.1	4.7	lower
Typing	4.4	4.2	higher
Business Machines	3.5	4.3	lower
Hotel Office	4.5	4.2	higher
Hotel PBX	4.3	4.7	lower
Travel Ag. Tech.	5.000	5.006	lower
Secretarial Science	4.5	4.4	higher
Management	4.6923	4.6920	higher
Police Science	5.1	5.0	higher

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[a] On this scale high values mean high status (prestige), and low values mean low status (prestige).

TABLE 6.24

COMPARISON OF IN CLASS EXPECTED INCOME AND COMPLETERS' REPORTED INCOME BY STATUS

		COMPLETERS	IN CLASS	EXPECTATIONS GAP
Nurse's Aide	White Collar	6678	4000	2678
	Blue Collar	7679	5773	1906
Practical Nursing	White Collar	6910	7714	- 804
	Blue Collar	8236	7956	280
Registered Nursing	White Collar	11438	11841	- 403
	Blue Collar	11203	11260	- 57
Hospital Ward Clerk	White Collar	6391	5500	891
	Blue Collar	6637	7000	- 363
Dental Hygiene	White Collar	11633	11949	- 316
	Blue Collar	13500	12182	1318
Emergency Medical Tech.	White Collar	12017	11786	231
	Blue Collar	8807	9375	- 568
Air Conditioning	White Collar	11006	11150	- 144
	Blue Collar	13717	12250	1467
Auto Mechanics	White Collar	15612	8375	7237
	Blue Collar	12315	14000	-1685
Cosmetology	White Collar	5888	12500	-6612
	Blue Collar	7679	9595	-1916
Electronics Tech.	White Collar	23461	10583	12878
	Blue Collar	12763	7000	5763
Bookkeeping	White Collar	5393	7438	-2045
	Blue Collar	6226	6571	- 345
Typing	White Collar	4127	8778	-4651
	Blue Collar	8413	7667	746
Business Machines	White Collar	9638	9000	638
	Blue Collar	6804	7286	- 482
Hotel Office	White Collar	8226	4000	4226
	Blue Collar	6211	5500	711
Hotel PBX	White Collar	6620	9000	-2380
	Blue Collar	5081	13214	-8133
Travel Agency Tech.	White Collar	6257	15000	-8743
	Blue Collar	6012	n.a.	n.a.
Secretarial Science	White Collar	7125	6423	702
	Blue Collar	7331	7750	- 419
Management	White Collar	14147	12733	1414
	Blue Collar	11834	12500	- 666
Police Science	White Collar	11764	11405	359
	Blue Collar	10066	10600	- 534

to have status much different than those currently enrolled.

It is noteworthy that the two programs of most interest, dental hygiene and secretarial science, have students currently enrollees whose average status is higher than those who have completed. This finding provides no support for the hypothesis that there is a higher dropout rate among the low status enrollees in those programs. The evidence suggests that relatively few low status individuals enroll in those programs to start with, but those who do achieve the same completion rate as the high status individuals.

6.4 COMPARISON OF EXPECTED AND REALIZED INCOME BY PROGRAM

Another explanation for the differential completion rates in different programs between low and high status completers is the existence of different degrees of incorrect expectations between the two groups. For example, low status individuals may fial to enroll in high return programs because of an incorrect assumption that their returns would be low. As part of the in-class survey students were asked to estimate their income in the first year after completion (their expected income). This is compared to the average income received by completers in Table 6.24. The expectations gap is computed as the difference between the completers actual income and the students expected income.

This approach makes a number of heroic assumptions. First, it ignores those who are or will be employed, whether they are currently enrolled or have already completed. Second, it ignores any differences in other human capital stocks between the two groups. Third, it makes no allowance for wage inflation (between 1975 and 1976, or between 1976 and 1977). Finally, it compares those enrolled to those who completed;

no allowance is made for those who were discouraged from enrolling.

Average expectations gaps by program area are given in Table 6.25, where the averages are per program (not per individual). The figures suggest that high status students tend to underestimate their incomes moderately ($271 out of approximately $7600 would be about 3.5 percent), whereas low status completers overestimate their incomes by a similar small amount ($165 out of $7600 would be about 2.1 percent). It is significant that the upper status completers underestimate, while the lower status completers overestimate.

The results in Table 6.24 suggest that the failure of low status completers to achieve proportionate enrollment in dental hygiene may be due to low expectations of their incomes from the program. They underestimated their average incomes by $1318 per year, whereas the high status completers overestimated by $316. At the same time, unrealistically low expectations do not characterize low status enrollees in secretarial science.

6.5 REASONS FOR CHOICE OF INSTITUTION AND PROGRAM BY STATUS

There is a considerable cost differential between programs offered at the community colleges and those available at the vocational centers. Differential enrollment rates per program by status might reflect the different financial constraints faced by different status groups. As part of the in-class survey, respondents were asked to give the reasons they attended the institution in which they were enrolled. Five reasons were suggested plus an open ended ("other") category as given in Table 6.26. They were:

this is where my friends go
it costs less to go here
this is where I was advised to go

TABLE 6.25

AVERAGE EXPECTATIONS GAP PER PROGRAM BY PROGRAM AREA

	Low Status	High Status	All Status
Health	419	380	799
Trade/Industrial	907	3340	4247
Business/Office/Distributive	-1227[a]	-1355	-2428
Public Service	-534	359	-175
All Programs	-165	271	115

[a] Travel Agency Ticketing Omitted.

closest to home/job
only place where the program is offered in the area

The proportions of positive responses for each reason by status group (skill level) are given in Table 6.26. The most important reason for both status groups is proximity to home or job which reflects a cost constraint to some degree. The question on cost of the program is an important second reason for both.

It is interesting that the two cost reasons are more important for the low status students than the upper status students who are more likely to have chosen an institution because it is the only place the program is available or because it is where their friends attend.

The data in Table 6.27 indicate that advice was slightly more important for upper than lower status completers as a reason for choosing an institution. A breakdown of the importance of different sources of advice is given for each status group in Table 6.27. A value of one for a source indicates it was of no help to the group; a value of three indicates it was very helpful. For both groups family and friends were the most important sources with school counselors and post secondary representatives a distant second. It is interesting to note that low status students believe they received more help from all sources than did high status completers. This might suggest that low status individuals need more encouragement to raise their sights to post secondary education than do high status students. An important implication is that publicity programs designed to encourage low status completers may be relatively successful.

TABLE 6.26

PROPORTION OF POSITIVE RESPONSES FOR EACH REASON ON WHY THE INSTITUTION WAS CHOSEN BY THE STUDENT BY STATUS[a]

REASON	Proportion of Positive Responses	
	Blue Collar	White Collar
This is where my friends go to school	.04	.05
It costs less to go here	.42	.35
This is where I was advised to go	.23	.24
Closest to home/job	.48	.46
Only place where the program is offered in the area	.26	.30
Other	.19	.19

[a] Summing across status for each reason gives the proportion of in class respondents who checked the reason in response to the question. More than one response could be checked.

TABLE 6.27

AVERAGE RESPONSE TO THE QUESTION: HOW INFLUENTIAL HAVE THE FOLLOWING PEOPLE BEEN IN YOUR DECISION TO ENTER THIS PROGRAM? (1 = NO HELP, 2 = SOME HELP, 3 = VERY HELPFUL)[a]

SOURCE	BLUE COLLAR	WHITE COLLAR
High School Counselors and/or Teachers	1.7	1.5
Family Members and Relatives	2.4	2.3
Friends	2.1	2.0
College or Vocational School Representatives	1.6	1.6
Other	2.0	2.1

[a] Respondents were asked to evaluate the influence of each source.

CHAPTER 7

SUMMARY, CONCLUSIONS, AND RECOMMENDATIONS

This chapter draws together the major findings of the study and presents some recommendations. The purpose of the research project was to examine the effect of post secondary vocational and technical education on class and income inequality. As noted in a report by the National Research Council, "the implication that vocational education . . . perpetrates class distinctions has not been investigated." (National Research Council 1976, p. 10).

It is well known in the literature that the various branches of higher education draw students from different status levels in different proportions (Hansen and Weisbrod 1969, Jenks *et al.* 1972, Katz 1973), and it is often argued that this feature of the system supports and maintains class inequalities rather than overcoming them. Such arguments, however, rest on an unsubstantiated assumption that students from different backgrounds would achieve identical returns from each branch of higher education. What is needed is an estimation of the extent to which students from each status group benefit from their post secondary experience. This study provides such an estimation for the public post secondary vocational and technical education system of Southeast Florida.

7.1 SUMMARY

The core of the research project reported here was a survey of a sample of completers of selected public post secondary vocational and technical programs from a selected group of institutions from the academic years 1974-75 and 1975-76. A total of 642 questionnaires were received from a total of 1565 mailed (41 percent) and 1201 delivered (76.7 percent).

The sampling procedure oversampled small programs, blacks and males and the analysis was undertaken with appropriate adjustments for the oversampling. Nineteen programs from six institutions (three areawide vocational centers and three community colleges) were included in the survey.

The response to the survey (41 percent of those mailed, 53.5 percent of those delivered) was adequate. The results indicated that the average completers of public post secondary vocational and technical programs in Southeast Florida is a married white female aged 27 (at the time of the survey) who had a B average in high school and graduated from an areawide vocational center probably in the health area. She is employed full time at a job she likes a lot at an income of about $7600 per year. She enrolled in the vocational program to achieve a job objective, was satisfied with the program and felt it got her a better job than she would have obtained otherwise. Although most were employed in occupations for which their vocational training was not required, they found the training very helpful in performing on the job.

Given the focus of the study on the effect of post secondary vocational and technical education on students from different socioeconomic backgrounds, particular care was exercised in assigning students to different status groups. The following procedure was adopted. For all completers under 26 years of age, the status of the parent was used. For those over 26, the completers preprogram status was used for males, unmarried females and females married to males not in the labor force. The husband's status was used for married women over 26 if he was in the labor force.

The status measures used here were based on occupation (of parent, of respondent or husband depending on the respondent). Three measures were used. The first was based on the census classification of occupations and resulted in a blue collar/white collar dichotomy. The second, due to Duncan (1961), was based on the average income of the occupation and the third, due to Siegel (1971), was based on prestige. For married females, the largest group of completers, the status measure indicated that over 50 percent had high status socioeconomic backgrounds (such as white collar).

The dominant view of education in modern economics views it as an investment because it usually gives a return in the form of increased (lifetime) earnings over a period of time following its completion. A rate of return per year of post secondary vocational education was computed for the individuals in this survey by making a number of simplifying assumptions. It was assumed that each year of education made the same contribution to income so that the dollar return was estimated by dividing the individual's income by her year's of schooling measured in equivalent full time academic years. The result was approximately $636 dollars. Since the average income of a completer was about $7600, the assumption stated above implies that her income would have been $7600 - $636 = $6964 in the absence of the vocational program. If it is assumed that the cost of a year of education is the income foregone (tuition and classroom materials are paid with the proceeds of part time employment) then the rate of return over cost of a year of vocational education is $636/$6964 or 9.1 percent. This rate of return is close to the long term interest rate, suggesting that the rate of return on human capital is close to the rate of return on financial capital. A detailed analysis of the rate of return was not undertaken for different groups and programs but it would provide much helpful information.

Two approaches to the estimation of the effect of post secondary vocational and technical education on income inequality may be taken. The first would compare the incomes of completers to the incomes of an equivalent sample of high school graduates with both groups classified by status. The relationship between income and personal characteristics could be established for all high school graduates and used to predict "expected income" figures for the vocational completers. The difference between each expected income figure and the corresponding actual income level of the completer could be called the contribution of post secondary vocational and technical education. Summing the contribution over the low status group yields the contribution to lower status people. In like manner, summing over upper status individuals would yield the contribution to the upper status group. If the contribution to the upper status group is larger than the contribution to the lower status group, the inequality of income would be increased. That is, the rich would be made richer more quickly than the poor. If the contribution to the upper status group is smaller than the contribution to the lower status group, the inequality of income would be reduced.

A second approach would be to sum the contribution of vocational education to each individual, where the contribution was measured in the manner outlined in the discussion of the rate of return on vocational education given above. An average return per year of education is obtained by dividing an individual's income by her number of years of schooling, in full time academic years. The number of years (or portion thereof) spent by the individual in the vocational program would be multiplied by the return per year to estimate the contribution of vocational education to her income. Summing over the members of each status, the ratio of the contribution made to the upper status group, to the contribution made to the lower status group is obtained. If this inequality ratio exceeds unity, post secondary vocational education enhances inequality. If the ratio is less than unity, inequality is reduced.

Although both approaches are followed as part of this study, the second approach received major emphasis for two reasons. First, much of the literature on returns to education suggests that among individuals who acquire the same amount of higher education there will be a negative correlation between social status and ability. The question that is posed is this: Why do two individuals from different social classes choose the same amount of education. The literature suggests that the lower class individual is constrained from proceeding further up the educational system by a lack of financial resources; the upper class individual is constrained by a lack of ability (defined to include motivation and drive). Thus, the ability variable will be an important distinction between the two status groups and the comparison between vocational completers and the general population by status group will be distorted accordingly. The contribution of vocational education to lower status individuals will be overstated because it is confounded with ability. The second problem with the comparison between completers and the general population will be the difference in the length of the vocational program pursued by the two groups. Because of the financial constraint, lower status individuals will pursue less higher education than upper status individuals with the same ability. Thus, the contribution of vocational education to these lower status individuals will be less than the contribution to upper status completers. In the comparison with the general population the situation is even more unclear. If the lower status individual from the general population has less higher education than the lower status completer, the comparison will yield a positive benefit to her. On the other hand, if the higher status individual from the general population has more higher education than the high status completer, vocational education will yield a negative contribution to her. The point is that the effect of programs of different length will introduce a bias in an indeterminate direction. These two problems leave aside the problem of matching the sample in other respects such as region of the country, year, and so on. The problem with the human capital approach, aside from the constant dollar return assumption, is that it assumes that the completer would have pursued no other higher educational alternative if the vocational system was not available. In brief, the comparison group would be the same individuals without the programs. This approach is not entirely accurate but appears to be the best available.

There are a number of issues about why individuals choose to enroll in vocational programs which this study addressed through the use of a survey of students currently enrolled. One class from each program was selected for survey at each institution. Three of these issues were analyzed as part of this study. First, there was the question whether the mix of completers by status for each program reflected differences in enrollment or differences in drop out rates. Second, the study considered the relationship between expectations gaps by status. Specifically, was there a tendency for low status individuals to underestimate the income they could expect to receive on completing a given program. Finally, information was gathered on the extent to which individuals from each status group relied on advice in choosing their vocational institutions and programs.

7.2 CONCLUSIONS

The principal conclusion of this study is that the Southeast Florida public post secondary vocational and technical education system increases inequality. That is, it provides more economic benefits to upper status than to lower status individuals. In so far as social class is measured by income, class inequality is increased also. This finding is insensitive to the status measured used and holds for both the 1976 and 1977 cohorts of completers.

Given the well known tendency of upper status individuals to spend a longer time in the educational system, the finding that they gain more from post secondary education is not surprising. When length of post secondary program is controlled, however, the results still indicate that the system increases inequality. That is, for any given length of time in the system (such as a year, for example) the contributions to upper status individuals exceed those of lower status completers. The longer programs contribute more to inequality and because these are typically offered by the community colleges their programs tend to be more unequalizing than those of the areawide vocational centers. This tendency may be reinforced by higher tuition costs at the colleges.

If all completers received the same contribution to their incomes (in dollars) from their vocational programs, the effect of the vocational education system on inequality would depend on the ratio of the number of upper status completers to the number of lower status completers. In particular, if more upper status individuals took advantage of the public post secondary vocational and technical programs then inequality would be increased. This suggests that the ratio of upper status to lower status completers is a significant determinant of the effect of the vocational system on inequality.

On the other hand, if there were exactly the same number of completers from the two status groups, the effect on inequality would depend on the ratio of the average return (in dollars) received by upper status individuals to the return received by lower status completers. This suggests that a second important determinant of the effect of the post secondary vocational system on inequality is the ratio of the average rates of return received by the two status groups.

The results of this study suggest that more upper status than lower status individuals are served by the post secondary vocational system, and that the return of the upper status individuals exceeds that of the lower status completers. The system mainly serves the upper class, and the average upper class individual receives a greater reward for participation in it.

The effect on inequality can also be measured for different colors, sexes and age groups. There are more white than black completers, and the white completers realize higher average returns. There are more female than male completers, but the males realize a higher average return. There are more young than old completers (over 35) and younger completers have a higher average return.

In summary, public post secondary vocational and technical education enhances ineuqality in Southeast Florida. This reflects the tendency of the system to provide services to upper status individuals, and for such individuals to realize a greater reward. To alter this effect, government policies would have to increase the number of lower status individuals into the more profitable programs.

Six of the nineteen programs included in this study made larger contributions to the low status individuals than they did to the upper status completers: nurse's aide, emergency medical technology, air conditioning, cosmetology, typing and travel agency ticketing. The remaining acted to increase inequality: registered nursing, ward clerk, dental hygiene, auto mechanics, electronics, bookkeeping, business machines, management, hotel office procedures, hotel PBX, secretarial science and police science.

Of the six programs that reduced inequality three did so because there were disproportionately many low status completers (emergency medical technology, air conditioning and travel ticketing) even though their average return was lower than high status completers. Numbers of completers rather than the returns they received led to the reduction in inequality. An important question about these programs needs to be answered: Why do so many low status individuals complete them? Perhaps some of these completers could be channeled into more profitable programs.

Two programs provide a higher return to their low status than their high status completers: dental hygiene and secretarial science. Yet the under representation of low status individuals resulted in a positive contribution to inequality. Both programs require two years of work and the financial constraint may be a significant barrier to low status enrollment.

The three programs in the nursing area are particularly interesting. The nurse's aide program attracts disproportionately many low status completers and they achieve a higher return than the high status completers. The position is reversed for the practical and registered nursing programs. Again, financial constraints may play a major role in this funding. The more advanced the nursing program, the smaller the number of low status relative to high status completers. The low status completers have difficulty financing further training. At the same time, the average return achieved by the high status completers rises relative to that received by the low status completers. This finding suggests that the high status individuals with more ability take more advanced training, while many bright low status individuals remain locked into less training. Further, there is a tendency to use these three programs as a ladder. The nurse's aide program is used to "test the water", to acquire information about a nursing career. If the individual has a pleasant experience she will move to the next rung (practical nursing) and so on. A more detailed study of the nursing programs would be very informative. Is it an efficient way of acquiring information about nursing, and which status group most uses the ladder approach. There is also a two-tier hospital system in Southeast Florida: a public system and a collection of private hospitals. Wage differentials between the two tiers could be investigated and an analysis of the implication for inequality could be undertaken.

An analysis of the in class survey indicated that low status individuals are more-sensitive to cost factors than high status completers. There did not appear to be any significant differences in dropout rates that would explain the different program completion rates between status groups. Low status individuals tended to overestimate the income they could expect from their programs, while high status completers tend to make an underestimate. Both errors were, on average, small but the average concealed major expectation gaps for some of the programs. It was significant that low status individuals greatly underestimated the benefit from the dental hygiene program.

Completers from low socioeconomic backgrounds relied more on advice for choosing their programs. This is not surprising given the greater personal initiative required on average to move the socioeconomic scale. Children of upper status individuals may pursue post secondary education because it is "natural"; children from the low status group must go against tradition. This finding suggests that promotional publicity may have a significant impact of the enrollment of low status individuals in post secondary vocational and technical education.

7.3 RECOMMENDATIONS

Before making some recommendations based on the experience of this study a fundamental issue must be addressed. Is inequality bad? In a true meritocracy, able lower status individuals would move up the income distributions and less able upper status individuals would sink down the distribution. The existence of public higher education assists able low status individuals to improve their positions but also assists less able upper status individuals to maintain their privileged positions. If the reduction of inequality was the only goal of public higher education it might be appropriate to limit the number of upper status individuals who could participate in it. But this ignores the positive social benefits to be derived from an educated populace, regardless of social background. Thus, the more appealing remedy is to expand low status enrollment without limiting upper status participation. This could be done by allocating more resources to subsidizing low status individuals and less to subsidizing institutions and programs. Such policies would emphasize student loans, grants and work study programs aimed primarily at those from disadvantaged backgrounds. There are already some programs of this type, but this study indicates that they need to be expanded if inequality is to be reduced.

A second issue which arises from the experience of this study is the extent to which the tendency of the public post secondary vocational and technical educational system reflects the inequality in the social system, and the consequent implications for its ability to ameliorate it. The public post secondary VTE system is but one small part of the general educational system which is, in turn, but one part of the social and economic system. If the distribution of high school graduates is skewed in favor of upper status individuals the clientele of the post secondary system will be similarly skewed. If a significant number of employers practice discrimination against the disadvantaged, then equality of education will not be sufficient to produce a reduction in income inequality.

Nevertheless, because any one part of the educational system (or general social and economic system) cannot solve the problem of inequality, it is still incumbent on each to make a contribution. The problem will be ameliorated when all parts of the social system combine in a concerted effort to reduce it. Along these lines, these researchers would make the following recommendations:

1. Expand Financial Assistance to Lower Status Individuals Who Wish to Attend Public Post Secondary Vocational and Technical Education: This recommendation was discussed above and stems from the finding that lower status individuals are under represented in the post secondary VTE system. It should be clearly recognized that the major cost of education is the foregone income, rather than the expenses for tuition and classroom materials. Services that need to be expanded include: work study, cooperative education, student loans and grants.

2. Alter the Financing Structure for Post Secondary VTE to Give More Consideration to the Mix of Students by Status, and Less to the Overall Body Count.

The current financing system pays insufficient attention to the mix of enrollment by status. A lower status enrollee in most cases contributes the same funds to the institution as one from the upper status. Yet the cost of attracting and serving a lower status individual may be greater. Hence, it is often not cost effective for a VTE institution that is short of funds to attempt to expand its low status enrollment.

3. Conduct a Periodic Review of the Impact of VTE Programs on Inequality.

Such a review would assess the mix of enrollment by status, the gaps between expected and realized income by status, drop out rates by status, and possible discrimination by employers of the occupation for which the individuals are trained. Two programs are suggested as useful starting points for such a review: dental hygiene and the set of programs in the nursing area. Dental hygiene is the fastest growing occupation in Florida. Low status individuals are under respresented (in fact all completers were white females), but those that do complete achieve high returns. In the nursing area there are three programs: nurse's aide, practical nursing and registered nursing. These programs tend to act as a ladder for many individuals and, nationally, the development of higher nursing programs up to the Ph.D. indicate that the ladder is being extended. It is clear that the programs are linked together in a complex fashion and the implication of these linkages (or lack of them) for inequality should be studied.

4. Expand Promotional Schemes Designed to Increase the Demand for Post Secondary VTE Among Low Status Individuals.

The research reported here indicates that low status individuals make more intensive use of information sources in selecting their post secondary programs. These include family, friends, high school counselors and post secondary representatives. The clear implication is that programs designed to promote post secondary VTE will increase participation by lower status individuals.

In the course of this research considerable experience was gained in placement and follow up procedures. Although such procedures relate to the methodology of this study rather than the substantive question of methodology, these researchers have a recommendation on the subject of placement and follow up. The recommendation is that

5. Program Evaluations Should Be Undertaken by Means of Carefully Designed Panel Studies.

The optimal approach to placement and follow up would consist of a survey of all completers just prior to completion, followed by follow up surveys of a scientifically chosen small sample on an annual basis for several years after completion. Because the same individuals would be continuously followed up, this methodology is referred to as a panel survey.

The major problem with follow up studies appears to be non response. This arises because of the difficulty of locating completers a year or two after completion (one in four could not be located after two years for this study) and the need to collect detailed information on lengthy questionnaires. If a detailed questionnaire was filled in prior to completion the amount of post program information required would be very small. Further, a scientifically designed small sample could be chosen on the basis of the in-class information. Finally, by conducting small follow ups frequently the institution could retain contact with its completers.

On one other issue, the information gathered for this study sheds considerable light. This is the question of the emphasis on placement, as a means of evaluating VTE programs. In the opinion of these researchers

6. Placement Should be De-Emphasized as a Criterion for Evaluating Post Secondary Vocational and Technical Programs.

It is clear that vocational programs serve a variety of purposes for those who enroll in them. While most completers were not employed in jobs that required their programs, most found them very helpful in performing on their jobs. It is also clear that many students enroll in the programs as a form of insurance (against layoffs), to gather information about a possible occupation, or to evaluate their own ability in the post secondary system (after an unhappy experience in high school). It should be remembered that those enrolled in post secondary education are adults, and thus enrollment, by and large, should be a guide to program usefulness. Policymakers must be concerned about the allocation of scarce resources among programs, but this study would suggest that the best guide to the effectiveness of a program is the expressed opinions of its completers rather than placement statistics. The opinions should relate to the usefulness of the program in their work or in enabling them to make decisions about their careers, rather than to their enjoyment of the program.

BIBLIOGRAPHY

A. BOOKS, REPORTS AND MONOGRAPHS

Aitchison, J. and J. A. C. Brown. *The Lognormal Distribution* Cambridge, England: Cambridge University Press 1957.

Becker, G. S. *Human Capital* New York, New York: Columbia University Press For The National Bureau of Economic Research, Second Edition 1974.

Belitsky, A. H. *Private Vocational Schools and Their Students* Cambridge, Massachusetts: Schenkman Publishing 1969.

Blau, P. M. and O. D. Duncan. *The American Occupational Structure* New York, New York: John Wiley and Sons 1967.

Blaug, M. *Economics of Education 1* Baltimore, Maryland: Penguin Books, Inc. 1968.

Blaug, M. *Economics of Education 2* Baltimore, Maryland: Penguin Books, Inc. 1969.

Bowman, M. J., Debeauvais, M., Komarov, V. E. and J. Vaizey. *Readings in The Economics of Education* Paris, France: UNESCO 1968.

Bronfenbrinner, M. *Income Distribution Theory* Chicago, Illinois: Aldine 1971.

Carroll, A. and L. Ihnen. "Costs and Returns For Investment in Technical Schooling by a Group of North Carolina High School Graduates" *Economic Research Report No. 5* Department of Economics, North Carolina State University 1967.

Chiswick, B. R. *Income Inequality* New York, New York: Columbia University Press For The National Bureau of Economic Research 1974.

Cohn, E. *et al.* *The Costs of Vocational and Non-Vocational Programs* University Park, Pennsylvania: The Pennsylvania State University Institute For Research on Human Resources 1972.

Comptroller General of the United States, General Accounting Office. *What Is The Role of Federal Assistance for Vocational Education?* Washington, D.C.: 1974.

Copa, G. H. *Identifying Inputs Toward Production Function Application in Education* Minneapolis, Minnesota: University of Minnesota Research Coordinating Unit For Vocational Education Technical Report 1971.

Cramer, J. *Empirical Econometrics* Amsterdam, Holland: North Holland 1971.

Danenburg, W. P. *Evaluation of The Effectiveness of District Coordinating Councils For Vocational Education* Tallahassee, Florida: The Florida Advisory Council on Vocational and Technical Education 1975.

Duncan, O. D. "A Socioeconomic Index For All Occupations" pp. 109-138 in Reiss, A. J. Jr. Occupations and Social Status New York, New York: Free Press 1961.

Duncan, O. K., Featherman, D. L., and B. Duncan. Socioeconomic Background and Achievement New York, New York: Academic Press 1972.

Florida Statistical Abstract 1977. Gainesville, Florida: The University Presses of Florida.

Fishkind, H. H. et al. Methodology For Determining Needs for Vocational and Technical Education in Urban Areas in Florida Tallahassee, Florida: The Florida State Advisory Council on Vocational and Technical Education 1976.

Fitzpatrick, B. Women in Education New York, New York: Praeger 1976.

Ghazalah, I. A. The Role of Vocational Education in Improving Skills and Earning Capacity in the State of Ohio: A Cost Benefit Study Athens, Ohio: Ohio University, College of Business Administration, Division of Business Research 1972.

Gillie Sr., A. C. Principles of Post Secondary Vocational Education Columbus, Ohio: C. E. Merrill 1973.

Grossman, M. "The Demand For Health" Unpublished doctoral dissertation. Columbia University 1969.

Haley, W. "Human Capital Accumulation Over the Life Cycle" Unpublished doctoral dissertation. North Carolina State University, Raleigh 1971.

Hanoch, G. "Personal Earnings and Investment in Schooling" Unpublished doctoral dissertation. University of Chicago 1965.

Hanushek, E. A. "The Education of Negroes and Whites" Unpublished doctoral dissertation. Massachusetts Institute of Technology 1968.

Harris, M. A. Benefit Cost Comparison of Vocational Education Programs Tallahassee, Florida: The Florida State University Department of Educational Administration 1972.

Harris, M. A. and M. C. McInnis Jr. An Evaluation of the Florida State Plan for the Administration of Vocational Education Tallahassee, Florida: The Florida State University Department of Educational Administration 1972.

Hauser, R. M. and D. L. Featherman. The Process of Stratification New York, New York: Academic Press 1977.

Hansen, W. L. ed. Education, Income and Human Capital New York, New York: Columbia University Press For The National Bureau of Economic Research 1970.

Hu, T. et al. A Cost Effectiveness Study of Vocational Education University Park, Pennsylvania: The Pennsylvania State University Institute for Research on Human Resources 1969.

Hyde, Jr., W. D. Metropolitan Vocational Proprietary Schools Lexington, Massachusetts: D. C. Heath 1976.

Jackson, W. H. and R. J. Scott. The Development and Evaluation of Multi-Media Materials to Present Information About Vocational and Technical Education to Specific Target Groups Tallahassee, Florida: Florida State Advisory Council on Vocational and Technical Education 1975.

Jencks, C. et al. Inequality New York, New York: Basic Books 1972.

Juster,F. Thomas ed. Education, Income and Human Behavior New York, New York: McGraw-Hill 1975.

Kalecki, M. "On the Gibrat Distribution" Econometrica 13:161-170 1945.

Kaufman, J. J. et al. The Role of The Secondary Schools in the Preparation of Youth For Employment University Park, Pennsylvania: The Pennsylvania State University Institute for Research on Human Resources 1967.

Kaufman, J. M. and M. V. Lewis. The Potential of Vocational Education University Park, Pennsylvania: The Pennsylvania State University Institute for Research on Human Resources 1968.

Knegel, J. A. Rate of Profit, Distribution and Growth: Two Views Chicago, Illinois: Aldine Publishing Company 1971.

Latta, R. F. and M. L. Schmidt. Continued Evaluation of a Management Information System for Vocational-Technical Education Tallahassee, Florida: The Florida State University Department of Educational Administration 1972.

Lewis, M. V. et al. Attempts to Overcome Sex Stereotyping in Vocational Education University Park, Pennsylvania: The Pennsylvania State University Institute for Research on Human Resources 1976.

Levitan, S. A. and G. L. Mangum. Federal Training and Work Programs in the Sixties Ann Arbor, Michigan: Institute of Labor and Industrial Relations 1969.

Lydall, H. F. The Structure of Earnings Oxford, England: Oxford University Press 1968.

Malthus, T. R. First Essay on Population 1798 with Notes by James Bonar London, England: MacMillan 1926.

Medsher, L. L. and D. Tillery. Breaking the Access Barriers New York, New York: McGraw-Hill 1971.

Mincer, J. Schooling, Experience and Earnings New York, New York: Columbia University Press for the National Bureau of Economic Research 1974.

Minnesota Advisory Council for Vocational Education. A Re-examination of the Elimination of Bias in Minnesota's Area Vocational-Technical Institutes 1975.

Minnesota Advisory Council for Vocational Education. Toward the Elimination of Bias in Minnesota's Area Vocational-Technical Institutes 1974.

Minnesota Research Coordination Unit in Occupational Education. Review of Research on Student Selection and the Prediction of Success in Occupational Education Minneapolis, Minnesota: University of Minnesota 1969.

Minnesota Research Coordinating Unit for Vocational Education. Status of Former High School Students: Procedure for Local Assessment Minneapolis, Minnesota: University of Minnesota 1976.

National Advisory Council on Vocational Education. Report on Urban Vocational Education Washington, D.C. 1974.

National Research Council. Committee on Vocational Education Research and Development. Assessing Vocational Education Research and Development Washington, D.C.: National Academy of Sciences 1976.

Pareto, V. Cours d'Economie Politique Lausanne, Switzerland: Rouge 1897.

Pejovich, S. et al. Social and Private Costs and Rates of Return for Post Secondary Technical Education in the Southwest Department of Economics, Texas A & M University, College Station, Texas 1969.

Podoluk, J. Education and Earnings Ottawa Dominion Bureau of Statistics, Central Research and Development Staff 60-65 1965.

Purrington, G. S. Expectations and Satisfactions of Parents and Students With Vocational-Technical Education Tallahassee, Florida: The Florida State University Department of Educational Administration 1972.

Raepple, K. The Role of Florida Vocational-Technical Education in Providing Services for the Handicapped Tallahassee, Florida: The Florida State University Department of Educational Administration 1972.

Reynolds, L. G. Principles of Economics Homewood, Illinois: Richard D. Irwin, Fifth Edition 1976.

Ricard, D. Principles of Political Economy 1817 Homewood, Illinois: Richard D. Irwin 1963.

Schaefer, C. J. and J. J. Kaufman. Vocational Education: Social and Behavioral Perspectives Lexington, Massachusetts: D. C. Heath 1971.

Schaefer, C. J. and J. J. Kaufman. New Directions for Vocational Education Lexington, Massachusetts: D. C. Heath 1971.

Schultz, T. W. ed. Investment in Education Chicago, Illinois: The University of Chicago Press 1972.

Selltiz, C. et al. Research Methods in Social Relations New York, New York: Holt, Rinehart and Winston, Third Edition 1976.

Sewell, W. H. and R. M. Hauser. Education, Occupation and Earnings New York, New York: Academic Press 1975

Siegel, P. M. "Prestige in the American Occupational Structure" Unpublished doctoral dissertation. University of Chicago 1971.

Taubman, P. and T. Wales. *Higher Education and Earnings* New York, New York: McGraw-Hill 1974.

Thurow, L. "Education and Economic Equality" The Public Interest 28:66-81 1972.

U.S. Congress 94th Congress Second Session *Education Amendments of 1976* Washington, D.C.: U.S. Government Printing Office PL - 94 - 482.

U.S. Congress. Sub-Committee on Elementary, Secondary and Vocational Education of the Committee on Education and Labor. House of Representatives 94th Congress First Session. *Vocational and Occupational Education* Hearings on HR 19 and Related Bills Volume 1-3, Washington, D.C.: U.S. Government Printing Office 1975.

U.S. Congress. Sub-Committee on Elementary, Secondary and Vocational Education of the Committee on Education and Labor. House of Representatives 94th Congress, Second Session, *Vocational Education Amendments of 1974* Hearings on HR 14454, Washington, D.C.: U.S. Government Printing Office 1975.

U.S. Department of Commerce. Social and Statistics Administration *OBERS Projections Volume 1*, Washington, D.C.: U.S. Water Resources Council 1972.

Wilms, Wellford W. *Public and Proprietary Vocational Training* Lexington, Massachusetts: D. C. Heath and Co. 1975.

Wisconsin Board of Vocational, Technical and Adult Education. *Barriers to Enrollment in Vocational, Technical and Adult Education Programs in Wisconsin* Wisconsin Rapids, Wisconsin 1976.

Yamane, Taro. *Statistics* New York, New York: Harper and Row, Third Edition 1973.

Zymelman, M. *The Economic Evaluation of Vocational Training Programs* Baltimore, Maryland: The Johns Hopkins University Press for The World Bank 1976.

BIBLIOGRAPHY

B. JOURNAL ARTICLES

Ashenfelter, O. and J. Mooney. "Graduate Education, Ability, and Earnings" The Review of Economics and Statistics 50:78-86 1968.

Ashenfelter, O. and J. Mooney. "Some Evidence on the Private Returns to Graduate Education" Southern Economic Journal 34:247-256 1968.

Becker, G. S. "Underinvestment in College Education" American Economic Review 50:346-354 1960.

Becker, G. and B. Chiswick. "Education and the Distribution of Earnings" American Economic Review 56:358-369 1966.

Ben-Porath, Y. "The Production of Human Capital and the Life Cycle of Earnings" Journal of Political Economy 75:352-365 1967.

Ben-Porath, Y. "The Production of Human Capital Over Time" in Hansen, W. (Ed.) Education, Income and Human Capital Studies in Income and Wealth 35:129-147 1970.

Blaug, M. "Human Capital Theory: A Slightly Jaundiced Survey" Journal of Economic Literature 14:827-855 1976.

Bird, W. I. et al. "Influence of Race, Socioeconomic Status and Educational Achievement on Educational Socialization for Vocational Education" Journal of Vocational Education Research 1, 3:31-46 1976.

Bowles, S. "Schooling and Inequality From Generation to Generation" Journal of Political Economy 80, Supplement:219-251 1972

Bowles, S. and H. Gintis. "The Problem with Human Capital Theory - A Marxian Critique" The American Economic Review 65, 2:74-82 1975.

Bowman, M. J. "A Graphical Analysis of Income Distribution in the United States" The American Economic Review 35:607-628 1945.

Bowman, M. "Learning and Earning in the Postschool Years" Review of Research in Education 2:202-244 1974.

Bowman, M. "The Human Investment Revolution in Economic Thought" Sociology of Education 39:113-130 1966.

Carnoy, M. "Rates of Return to Schooling in Latin America" Journal of Human Resources 2:359-374 1967.

Champernowne, D. G. "A Model of Income Distribution" Economic Journal 1953 63: 318-351

Chiswick, B. and J. Mincer. "Time-Series Changes in Personal Income Inequality in The United States From 1939 with Projections to 1985" Journal of Political Economy 80:534-566 1972.

Chiswick, B. "The Average Level of Schooling and the Intra-Regional Inequality of Income: A Clarification" *The American Economic Review* 58:495-500 1968.

Corazinni, A. J. "The Decision to Invest in Vocational Education" *Journal of Human Resources* 3, Supplement:88-120 1968.

Corazinni, A. J. "When Should Vocational Education Begin?" *The Journal of Human Resources*

Duncan, O. "Ability and Achievement" *Eugenics Quarterly* 15:1-11 1968.

Friedman, M. "Choice, Chance and the Personal Distribution of Income" *Journal of Political Economy* 61:273-290 1953.

Glick, P. and H. Miller. "Educational Level and Potential Income" *American Sociological Review* 21:307-312 1956.

Griliches, Z. and M. Mason. "Education, Income and Ability" *Journal of Political Economy* 80:74-103 1972.

Haley, W. "Human Capital: The Choice Between Investment and Income" *American Economic Review* 63:929-944 1973.

Hanock, G. "An Economic Analysis of Earnings and Schooling" *Journal of Human Resources* II : 310-329 1967.

Hansen, W. "Total and Private Rates of Return to Investment in Schooling" *Journal of Political Economy* 71:128-140 1963.

Hanushek, E. "Regional Differences in the Structure of Earnings" *The Review of Economics and Statistics* 55:204-213 1973.

Hause, J. "Earnings Profile: Ability and Schooling" *Journal of Political Economy* 80, Supplement:S108-S138 1972.

Hill, T. P. "An Analysis of the Distribution of Wages and Salaries in Great Britain" *Econometrica* 27:355-381 1959.

Houthakker, H. "Education and Income" *The Review of Economics and Statistics* 41:24-28 1959.

Hu, T. *et al.* "Economic Returns to Vocational and Comprehensive High School Graduates" *The Journal of Human Resources* 6:25-50 1971.

Hunt, S. "Income Determinants for College Graduates and the Return to Educational Investment" *Yale Economic Essays* 1963. Pp. 305-357.

Jorgenson, D. W. "Capital Theory and Investment Behavior" *The American Economic Review* 53:247-257 1963.

Johnson, T. "Returns From Investment on Human Capital" *The American Economic Review* 60:546-560 1970.

Lindsay, C. "Measuring Human Capital Returns" *Journal of Political Economy* 79:1195-1215 1971.

Lippman, S. A. and J. J. McCall. "The Economics of Job Search: A Survey" *Economic Inquiry* XIV:155-189.

Mandelbrot, B. "Paretian Distributions and Income Maximization" *Quarterly Journal of Economics* 76:85-87 1962.

Mincer, J. and S. Polachek. "Family Investments in Human Capital: Earnings of Women" *Journal of Political Economy* Supplement:76-108 1974.

Mincer, J. "The Distribution of Labor Income: A Survey With Special References to the Human Capital Approach" *Journal of Economic Literature* VIII:1-26 1970.

Mincer, J. "On-The-Job Training: Costs, Returns and Some Implications" *Journal of Political Economy* 70:50-79 1962.

Mincer, J. "Investment in Human Capital and Personal Income Distribution" *Journal of Political Economy* 66:281-302 1958.

Morgan, J. and M. David. "Education and Income" *Quarterly Journal of Economics* 77:423-437 1963.

Morgenstern, R. "Direct and Indirect Effects on Earnings of Schooling and Socio-economic Background" *The Review of Economics and Statistics* 55:225-233 1973.

Nickens, J. and J. Wattenbarger. "Characteristics of Students Enrolled in Florida Post High School Occupational Education Programs" *Florida Journal of Educational Research* 15:57-68 1973.

Noeth, R. J. and G. R. Hanson. "Education and Employment of Post-Secondary Vocational-Technical and Transfer Students After Five Years" *The Journal of Vocational Education Research* 1, 3:15-30 1976.

Parsons, D. "The Cost of School Time, Foregone Earnings and Human Capital Formation" *Journal of Political Economy* 80:251-266 1972.

Rivlin, A. "Income Distribution - Can Economists Help?" *American Economic Association* 65(2):1-15 1975.

Schultz, T. "Capital Formation by Education" *Journal of Political Economy* 68:571-583 1960.

Schultz, T. "Investment in Human Capital" *The American Economic Review* 51:1-17 1961.

Schultz, T. "Investment in Human Capital: Comment" *The American Economic Review* 51:1026-1039 1961.

Schultz, T. "Investment in Man: An Economist's View" *The Social Service Review* 33:109-117 1959.

Schultz, T. Reflections on Investment in Man" *Journal of Political Economy* 70, Supplement:51-58 1962.

Sewell, W. and V. Shah. "Parents' Education and Children's Educational Aspirations and Achievements" American Sociological Review 33:191-209 1968.

Smith, J. and D. Wolfle. "The Occupational Value of Education For Superior High School Graduates" Journal of Higher Education 28:201-212 1956.

Taussig, M. K. "An Economic Analysis of Vocational Education in the New York City High Schools" Journal of Human Resources 3, Supplement:59-87 1968.

Warmbrod, J. R. "Evaluation Research in Vocational Education" Beacon 6, 1:6-10 1977.

Weisbrod, B. "The Valuation of Human Capital" The Journal of Political Economy 69:425-436 1961.

Weisbrod, B. and P. Karpoff. "Monetary Returns to College Education, Student Ability and College Quality" The Review of Economics and Statistics 50:491-497 1968.

Weiss, R. "The Effect of Education on the Earnings of Blacks and Whites" The Review of Economics and Statistics 52:150-159 1970.

Welch, F. "Black-White Differences in Returns to Schooling" The American Economic Review 63:893-907 1973

Welch, F. "Education in Production" Journal of Political Economy 78:35-59 1970.

Welch, F. "Human Capital Theory, Education, Discrimination, and Life Cycles" The American Economic Review 65:63-73 1975.

Welch, F. "Relationship Between Income and Schooling" Review of Research and Education 2:179-201 1974.

APPENDIX A

QUESTIONNAIRE USED TO SURVEY COMPLETERS

THIS QUESTIONNAIRE HAS BEEN REDUCED TO 8-1/2 X 11 FOR THE REPORT.

34. If you did not look for a job immediately after completing the vocational program, why not? (circle one)
- (1) continued in job I already had
- (2) had a new job lined up before completing the program
- (3) continued my education
- (4) decided not to work for personal reasons
- (5) other (specify) ______________________________

35. If you continued in a job you already had why did you do so?
- (1) I took the vocational program to help me in that job
- (2) I could not find a job related to the vocational program
- (3) other (specify) ______________________________

36. How many months passed after completing the vocational program before you found a job? (circle one)

0 1 2 3 4 5 6 7 8 9 10 11 12+

If more than one month passed why did it take that long? ______________________________

____

37. We would like to know what jobs you have held since completing the vocational program. Please provide that information below.

	What was the job?	How many months held?	Was it related to your vocational program?	
First job	____________	____________	yes	no
Second job	____________	____________	yes	no
Third job	____________	____________	yes	no
Fourth job	____________	____________	yes	no
Fifth job	____________	____________	yes	no

---

1. What is your race/ethnic background? (circle one)
- (1) American Indian
- (2) Black American
- (3) Cuban National
- (4) Spanish American
- (5) Oriental/Asian
- (6) Caucasian
- (7) Other ____________

2. What is your sex? (circle one) (1) male (2) female

3. What was your age on your last birthday? ____________

4. While in high school, did you complete a vocational course or series of courses?
- (1) yes
- (2) no

5. What was your overall grade point average in high school? (circle one)
- (1) Close to A
- (2) Close to B
- (3) Close to C
- (4) Below C
- (5) Did not attend high school
  Have GED Diploma

6. We would like to know what programs or classes you have completed since high school. Please provide that information below.

	What was the program?	What school or institution offered program?	How many hours each week were you in class?	How many months were you in the program?	What year did you complete the program?
1st program	________	____________	________	________	________
2nd program	________	____________	________	________	________
3rd program	________	____________	________	________	________
4th program	________	____________	________	________	________
5th program	________	____________	________	________	________

7. Who was the head of your household when you were a teenager? (circle one)
- (1) Father
- (2) Mother
- (3) Other (specify) ____________

8. What was the highest grade completed by the head of the household in which you were reared, at the time you were living there? (circle the number)

Grade and Middle School	High School	Junior College	Senior College	Graduate Studies
0 1 2 3 4 5 6 7 8	9 10 11 12	13 14	15 16	17 18 19 20

9. What was the job held by the head of the household while you were a teenager? (If not sure, make your best guess) ______________________________

What did he/she do on that job? ______________________________

10. What is your marital status? (circle one)
- (1) Married
- (2) Single
- (3) Divorced/Separated
- (4) Widowed

11. If you are married (or have been married), what was the highest grade completed by your husband/wife? (circle the number)

Grade and Middle School	High School	Junior College	Senior College	Graduate Studies
0 1 2 3 4 5 6 7 8	9 10 11 12	13 14	15 16	17 18 19 20

12. If you are married now, or ever were married, what is/was your husband's/wife's occupational status? (circle as many as apply)

(1) Homemaker (3) Employed (5) Seeking a full time job immediately
(2) Retired (4) Military Service (6) Full time student
(7) Other (specify) ____________________

13. If you are married now, or ever were married, what is/was the title of your husband's/wife's job? (If not sure, make your best guess)

____

What did he/she do on that job? ____________________

14. What is your occupational status? (circle as many as apply)

(1) Homemaker (3) Employed (5) Seeking a full time job immediately
(2) Retired (4) Military Service (6) Full time student
(7) Other (specify) ____________________

15. If you are employed, how many hours a week do you work for pay? (circle one)

(1) 1-20 (2) 21-34 (3) 35+

16. If you are employed, what is your job title? ____________________

What do you do on your job? ____________________

17. What is the name of the organization you work for? ____________________

18. What product or service does this organization provide to its customers/clients?

____

19. What kind of organization employs you? (circle one)

(a) public (part of federal, state or local government)
(b) private (nonprofit)
(c) local organization
(d) part of organization with branches outside South Florida
(e) other (specify) ____________________

20. If employed, how well do you like the job you have now?

(1) like it a lot (3) dislike it somewhat
(2) like it somewhat (4) dislike it a lot

21. Why do you feel this way about your job? ____________________

22. We would like to know how the programs or classes you have completed since high school relate to your job. Please provide that information below.

What was the program?	Is it required by your employer?		How helpful is the program in performing the duties of your job?		
____________	Yes	No	very helpful	some help	no help
____________	Yes	No	very helpful	some help	no help
____________	Yes	No	very helpful	some help	no help
____________	Yes	No	very helpful	some help	no help

23. If you are employed, what is your yearly income? (circle one)

(1) $0 - $4,000
(2) $4,000 - $5,000
(3) $5,000 - $6,000
(4) $6,000 - $7,000
(5) $7,000 - $8,000
(6) $8,000 - $9,000
(7) $9,000 - $10,000
(8) $10,000 - $12,000
(9) $12,000 - $15,000
(10) $15,000 - $20,000
(11) $20,000+

*****Our records indicate that you completed the ____________ program or course at ____________ in the year ____________. Please answer the questions below with this program in mind.

24. What was the highest grade you had completed at the time you entered the vocational program? (circle the number)

Grade and Middle School	High School	Junior College	Senior College	Graduate
0 1 2 3 4 5 6 7 8	9 10 11 12	13 14	15 16	17 18 19 20

25. Why did you enroll in the vocational program (circle as many as apply)

(1) to prepare for a job I expected to obtain
(2) to keep the job I had
(3) to obtain a promotion or wage increase
(4) to prepare myself to change occupations
(5) other (specify) ____________________

26. If you circled more than one reason in question 24, which is the most important reason you enrolled? (circle one)

(1) (2) (3) (4) (5)

27. Which of your goals have been satisfied by the vocational program and which have not?

satisfied goals: ____________________

goals not satisfied: ____________________

28. For those goals which have not been satisfied, is there something about the program that is to blame?

(1) Yes (2) No Comment ____________________

29. Do you think your vocational training helped you get a better job than you would have without it?

(1) Yes (2) No Comment ____________________

30. What were you doing just before you entered the vocational program? (circle one)

(1) entered directly from high school
(2) entered directly from military service
(3) entered after working full time for a period of time (excluding summer jobs)
(4) entered after spending at least one year as homemaker
(5) other (specify) ____________________

31. If you were employed before entering the vocational program, what was your job?

____

What did you do on that job? ____________________

32. If you were employed during the vocational program, what was your job?

____

What did you do on that job? ____________________

33. Did you look for a job immediately after completing the vocational program?

(1) Yes (2) No If yes, skip to question #36.

APPENDIX B

QUESTIONNAIRE USED TO SURVEY IN CLASS STUDENTS

THIS QUESTIONNAIRE HAS BEEN REDUCED TO

8-1/2 X 11 FOR THE REPORT.

1. What is your program or major? ____________________

2. What was your age on your last birthday? __________

3. What is your sex? (circle one)
   (1) Male
   (2) Female

4. What is your race/ethnic background? (circle one)
   (1) American Indian
   (2) Black American
   (3) Cuban National
   (4) Spanish American
   (5) Oriental/Asian
   (6) Caucasian
   (7) Other ______________

5. What is your marital status?(circle one)
   (1) Married
   (2) Single
   (3) Divorced/Separated
   (4) Widowed

6. What was the highest grade you had completed at the time you entered this vocational program? (circle the number)

Grade and Middle School	High School	Junior College	Senior College	Graduate
0 1 2 3 4 5 6 7 8	9 10 11 12	13 14	15 16	17 18 19 20

7. While in high school, did you complete a vocational course or series of courses?
   (1) Yes
   (2) No

8. What was your overall grade point average in high school? (circle one)
   (1) Close to A
   (2) Close to B
   (3) Close to C
   (4) Below C
   (5) Did not attend high school. Have GED Diploma

9. How many hours a week are you in vocational classes? (circle one)
   (1) 0-10 (2) 11-20 (3) 21-25 (4) 26-30 (5) More than 30

10. When are you usually in class? (circle one)
   (1) daytime, mostly (2) evening mostly (3) Both day and evening

11. What other vocational classes or programs are you in? ____________________

12. What is your occupational status? (circle as many as apply)
   (1) Homemaker
   (2) Retired
   (3) Employed
   (4) Military Service
   (5) Seeking a full time job immediately
   (6) Full time student
   (7) Other (Specify) ____________________

13. If you are employed, how many hours a week do you work for pay? (circle one)
   (1) 0-20 (2) 20-40 (3) 40 +

14. If you are employed, are your vocational studies related to your job?
   (1) Yes (2) No

15. If you are employed, what is your job title? ____________________

   What do you do on your job? ____________________

16. If you are employed, what is your yearly income? (circle one)
   (1) $0 - $4,000
   (2) $4,001 - $6,000
   (3) $6,001 - $8,000
   (4) $8,001 - $10,000
   (5) $10,001 - $15,000
   (6) $15,001 - $20,000
   (7) $20,000 +

17. What were you doing just before you entered this vocational program?(circle one)
   (1) Entered directly from high school
   (2) Entered directly from military service
   (3) Entered after working full time for a period of time (excluding summer job)
   (4) Entered after spending at least one year as homemaker
   (5) Other (specify) ____________________

18. If you were employed before entering this vocational program, what was your job?

   ____

   What did you do on that job? ____________________

19. Who was the head of your household when you were a teenager? (circle one)
   (1) Father
   (2) Mother
   (3) Other (Specify) ____________________

20. What was the highest grade completed by the head of the household in which you were reared, at the time you were living there? (circle the number)

Grade and Middle School	High School	Junior College	Senior College	Graduate
0 1 2 3 4 5 6 7 8	9 10 11 12	13 14	15 16	17 18 19 20

21. What was the job held by the head of the household while you were a teenager? (If not sure, make your best guess) ____________________

What did he/she do on that job? ____________________

22. If you are married (or have been married), what was the highest grade completed by your husband/wife? (circle the number)

Grade and Middle School									High School				Junior College		Senior College		Graduate			
0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20

23. If you are married now, or ever were married, what is/was your husband's/wife's occupational status? (circle as many as apply)
(1) Homemaker (3) Employed (5) Seeking a full time job immediately
(2) Retired (4) Military Service (6) Full time student
(7) Other (specify) ____________________

24. If you are married now, or ever were married, what is/was the title of your husband's/wife's job? (If not sure, make your best guess)

____

What did he/she do on that job? ____________________

25. Where did you first hear of this vocational program? ____________________

26. Why did you choose to attend this particular school? (circle as many as apply)
(1) This is where my friends go to school
(2) It costs less to go here
(3) This is where I was advised to go
(4) Closest to home/job
(5) Only place where the program is offered in the area
(6) Other (specify) ____________________

27. How influential have the following people been in your decision to enter this vocational program? (circle appropriate number for each resource)

Persons	No Help	Some Help	Very Helpful
High School Counselors and/or teachers	1	2	3
Family Members and Relatives	1	2	3
Friends	1	2	3
College or Vocational School Representatives	1	2	3
Other ____________________	1	2	3

28. Why did you enroll in this vocational program? (circle as many as apply)
(1) To prepare for a job I expect to obtain
(2) To obtain a promotion or wage increase
(3) To keep my present job
(4) To prepare myself to change occupations
(5) Other (specify) ____________________

29. If you circled more than one reason in question 28, which is the most important reason you enrolled? (circle one) 1 2 3 4 5

30. We want to know how much income you are giving up to attend this vocational program. If you were not enrolled in this program but were working full time instead how much money would you make this year? (If not sure, make your best guess)
(1) $0 - $4,000 (5) $10,001 - $15,000
(2) $4,001 - $6,000 (6) $15,001 - $20,000
(3) $6,001 - $8,000 (7) $20,000 +
(4) $8,001 - $10,000

31. You may also pay fees and buy books and equipment for the vocational program. How much money will you spend on these for this program? (If not sure, make your best guess) $ ____________ per term.

32. Which one of the following best describes what you hope to be doing next year?
(1) Begin a full-time paying job (3) Become a homemaker
(2) Continue my training (4) Begin full-time military service
(5) Other (specify): ____________________

33. If you expect to be employed full time next year, what is the job you hope to hold? (If not sure, make your best guess) ____________________

Briefly describe what you will do on that job ____________________

____

34. Do you expect this program to provide you with skills that will assist you in performing the job you hope to get? (circle one)
(1) Yes (3) Will not be employed next year
(2) No (4) Other ____________________

35. If you expect to be employed full time next year, what do you think your approximate yearly salary will be? (circle your best guess)
(1) $0 - $4,000 (5) $10,001 - $15,000
(2) $4,001 - $6,000 (6) $15,001 - $20,000
(3) $6,001 - $8,000 (7) $20,000 +
(4) $8,001 - $10,000